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TWENTIETH REPORT

(SEVENTH BIENNIAL)

OF THE

STATE BOARD OF HEALTH

OF THE

STATE OF NEW HAMPSHIRE

FOR THE FISCAL PERIOD ENDING AUGUST 31, 1908

CONCORD, NEW HAMPSHIRE
1908

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STATE OF NEW HAMPSHIRE.

OFFICE OF THE STATE BOARD OF HEALTH,
STATE HOUSE, September 1, 1908.

To His Excellency the Governor and the Honorable Council:

I have the honor to present herewith the twentieth report of the State Board of Health.

Respectfully submitted,

Irving A. Watson

Secretary.

REPORT.

The report herewith presented represents only a part of the work of the State Board of Health for the period which it embraces. To give anything like a complete narrative would enlarge the volume to an extent not deemed to be advisable. We have, therefore, included such work as would be both instructive and interesting, and perhaps more important as a matter of record.

Considerable space has been given to laboratory work, as a matter of public information and education. The examination of the public water supplies of the state has been continued, and the results of a large amount of labor devoted to the examination of foods and drugs.

In the category of that which is not included, are the Pure Food Laws of the State, which have been published in a separate pamphlet; the Standards of Purity for Food Products, published in the *Sanitary Bulletin*, Vol. 3, No. 2; pamphlets on the Restriction and Prevention of Scarlet Fever, *Sanitary Bulletin*, Vol. 2, No. 14, and other subjects connected with the public health interests of the state published from time to time in the *Sanitary Bulletin*.

Still further might be included many interesting communications in the voluminous correspondence of the board relating particularly to the management of communicable diseases, questions regarding local nuisances, the pollution of public water supplies, the protection of summer resort localities, the sewering and draining of towns, etc.

Two divisions of the work of the State Board of Health, which constitutes a State Board of Lunacy, and a Department of Vital Statistics, will be found in two separate reports covering the duties and operations of those departments.

Public Water Supplies.

In this report, from page 3 to page 128, inclusive, is an account of the public water supplies of the state and the results of chemical and bacteriological examinations of these various waters. The statistical tables covering this particular work have been continued for a few years, for the purpose of comparison and as a convenient reference in the study of these supplies as they have shown up from time to time. It is perhaps unnecessary to state that this work has resulted in many instances in such changes and

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alterations as have been necessary to safeguard against dangerous contamination. In a very few instances the problem has not yet been wholly solved, but is likely to be in the near future, inasmuch as it appears to be a growing policy of the state to exclude, as far as possible, dangerous contaminations from our lakes and streams and to recognize the rights of riparian owners to waters in their normal purity.

As a further evidence of this purpose may be noted the special report on water supplies, pages 131 to 168, inclusive. These reports show action taken in connection with the Lebanon water supply, the protection of the waters of Lake Winnepesaukee and Lake Paugus, and also of the Asquam Lakes, the Hillsborough Bridge water supply, and a consideration of the supplies of Durham, Hancock, New Hampton, Hampton Beach improvements, Sunapee Lake, and Lisbon. Other supplies are still under consideration and investigation, for the purpose of extending further protection.

Pure Food and Drugs Law.

The legislature of 1907 passed a law entitled "An Act for Preventing the Manufacture or Sale of Adulterated or Misbranded, or Poisonous, or Deleterious Foods, Drugs, Medicines, and Liquors."

The federal law was followed as closely as possible in the enactment of this law, in order that a possible coöperation between state and federal authorities might be secured, and which would result in greater benefit to the people of the state. Such has proven to be the case.

The law and the work being done under it, was immediately recognized by the United States Government, in their acceptance, as authoritative, of such work done at the State Laboratory of Hygiene. Special authority was conferred upon the chemist and the director of the laboratory in certain cases bearing upon the violation of the federal law in the instance of adulterated or misbranded goods shipped into this state. Also, following the passage of the federal law, and after passing the critical and severe examination required by the government, our chemist, Mr. C. D. Howard, was commissioned Special United States Food Chemist. Later, our position was still further strengthened by the conferring by the Secretary of Agriculture of special authority to collect samples and to bring suits in the federal courts.

An account of much of the work done in the New Hampshire State Laboratory of Hygiene will be found in this volume. Briefly, it may be stated that most salutary results have followed, in that many adulterated, misbranded and fraudulent articles that formerly were sold without question, are now excluded from the state.

The Food and Drugs Law has been published in pamphlet form

(N. H. Sanitary Bulletin, October, 1907), and has been extensively distributed, special pains having been taken to place a copy in the hands of dealers in foods and drugs.

Commission of Lunacy.

The State Board of Health, which is also the State Board of Lunacy, issues a regular biennial Lunacy Report to the legislature; but it may not be out of place to state that the board has carried out the law as far as possible in the transfer of the county insane to the New Hampshire State Hospital, and also that feature of the law which provides for state aid for indigent insane persons at that institution.

Owing to insufficient accommodations at the State Hospital, it has been impossible to transfer all the county patients, and it is therefore evident that the law which prohibits the counties from taking charge of and supporting the indigent insane at their several institutions after January 1, 1909, cannot be carried out, as there will be remaining at these almshouses at that time approximately 125 patients.

The number of insane persons at the New Hampshire State Hospital and at the several county institutions on August 31, 1908, is shown in the following table:

Asylums for Insane.	Inmates September 1, 1908.	Commitments during the eleven months ending August 31, 1908.	Discharged.	Deaths.
New Hampshire State Hospital	831	299	108	68
Rockingham County Asylum	32	4	13	3
Strafford County Asylum	3	1	1	....
Belknap County Asylum	2	3	3	1
Carroll County Asylum	3	1	....	1
Merrimack County Asylum	14	....	2	....
Hillsborough County Asylum	47	37	53	1
Cheshire County Asylum	6	....	....	....
Sullivan County Asylum	8	....	6	1
Grafton County Asylum	1	....	10	2
Coös County Asylum	7	2	1	....
Total for state	954	347	197	77

In connection with the state support of the indigent insane, it will be necessary for the legislature to take into consideration, as it doubtless

will, in connection with the state tax (and probably the subject is covered in the report of the Tax Commissioners), the great expense which must necessarily follow in the support of this unfortunate class. With the transfer of the remaining county insane to the State Hospital (when accommodations shall have been provided), and such other indigent persons as will be included under the provisions of the law, the expense will approximate two hundred thousand ($200,000) dollars a year for their support at that institution.

At the present time it is costing the state approximately one hundred and twenty-five thousand ($125,000) dollars for the support of this class.

Further information concerning the indigent insane will be found in the report above referred to of the Commissioners of Lunacy.

Vital Statistics.

The State Board of Health also makes a biennial report on the registration of births, marriages, divorces and deaths. The statistics which comprise the report become of great value as a sanitary guide after a series of years, as we now have. A single individual report is of but little value in itself, but from a chain of reports, covering a series of years, deductions of great value in showing accurately the movement of the population may be obtained.

A few facts of interest may be given in this connection: From the figures compiled for the period referred to, we find that the number of births, marriages and deaths for the years 1906 and 1907 are as follows:

	1906.	1907.	Increase.	Decrease.
Births	9,234	9,083	.....	151
Marriages	4,378	4,546	168	.....
Divorces	475	522	.....	47
Deaths	7,498	7,486	12	.....

The proportion of births, marriages, divorces and deaths to each 1,000 of the population for the two years mentioned was:

Year.	Births.	Marriages.	Divorces.	Deaths.
1906	21.30	10.09 (couples)	1.09 (couples)	17.29
1907	20.77	10.37 (couples)	1.17 (couples)	17.12

The death rate remains not far from the average for the past twenty years. It might naturally be expected, from the amount of sanitary work that has been done and the better knowledge which the people have of means and methods for the prevention of certain diseases, that the total mortality would be lowered, as it has been in many of the so-called communicable diseases, as, for instance, in typhoid fever, scarlet fever, diphtheria, tuberculosis, etc.; but this reduction has been offset by a large increase in the number of deaths from cancer, apoplexy, heart disease, Brights' disease and some other causes. The increase in the deaths from Bright's disease is especially noticeable, and merits careful study and consideration at the hands of the medical profession. It is possible that the actual increase in the mortality has not been quite so progressive as the figures would indicate, as it is apparent that a more careful classification of the causes of death has been made by the profession in recent years, this doubtless being the explanation of the diminution of deaths recorded under "Old Age."

The table herewith presented shows some of the variations referred to, as well as the deaths from the causes named for a period of twenty-four years:

TWENTIETH REPORT

STATE BOARD OF HEALTH

brought about through an almost constant crusade against the disease. Among the chief factors in the achievement of this result may be mentioned the advancement of medical science, which has revealed the true nature of tuberculosis, thereby giving a better insight into logical preventive and curative measures; the indispensable aid of the laboratory in assisting the physician to an early diagnosis; better food and environments for the working classes; improved personal hygiene; more out-of-door life; greater precautions against communicating the disease to others; better ventilation of schoolhouses, public institutions, etc.; in fact, improved hygienic conditions generally.

The State Board of Health has taken an active part in this work, in the distribution of literature relating to this disease, covering a period of more than twenty years. A bulletin on "The Prevalence, Cause, Restriction and Prevention of Consumption" has been distributed by the thousands, and still being circulated. Among the general topics taken up are:

The Prevalence of Consumption.
What Consumption is.
Prevention.—How to Avoid Consumption.
Early Symptoms should be Recognized.
Consumption a Curable Disease.
A Consumptive not Necessarily Dangerous.
The Destruction of Sputum.
Management in the Sick-Room.

This pamphlet will be sent to any citizen in the state upon application.

Rabies. (Hydrophobia.)

The presence of canine rabies throughout New England is a matter which should not be overlooked by the public, and especially by the owners of dogs. That this disease is present in many localities is believed from the experience of the past year or two, and from the occasional appearance of a rabid dog in an unexpected locality.

The horrible death of two persons in this state from rabies, contracted from the bite of a dog, ought to be a warning of the most glaring kind, and should lead the owners of such animals to keep them as far as possible under immediate control, and to observe with a searching eye any abnormal symptoms that may appear. Information upon this point, giving briefly the symptoms of rabies in dogs and how to deal with suspected cases, is given under the report of "Canine Rabies" in this volume. See page 266 and following.

New Hampshire State Sanatorium.

It is gratifying to announce that, after several years' effort, a state sanatorium for the treatment of tuberculosis has been provided for and the buildings are now being erected. The plans adopted are believed to be in accordance with what experience elsewhere has demonstrated to be the best.

We have examined the site with care, and are confident that no better situation can be found anywhere. The elevation of approximately 1600 feet, the splendid water supply and water power, the dry soil, and the magnificent scenery of mountains and valleys for miles, constitute features of the most desirable character. We expect to see the institution equipped and occupied within a year.

A most excellent description of the locality was published in the *Manchester Union*, as given herewith:

"The lot which the state has purchased for the sanatorium park contains 400 acres, about three fourths of which is wooded. There is a splendid growth of pine, spruce, and hardwood and the growth of pulp stock is very valuable. In the opinion of persons who have inspected the lot, the pulp wood alone will in a few years be worth double what the state is paying for the whole park at this time.

"The lot lies principally within the town of Benton and is but one and a half miles from Glencliffe station in Warren. It takes in two farms which are in a fair state of cultivation and there are two sets of farm buildings. One set includes a very good barn which will be retained for use. The farms cut about twenty tons of hay and the state officials sold the crop for this season before leaving.

"The lot is considerably larger than that which was first figured on. The trustees, who recommended this place after examining many about the state, recommended the purchase of 260 acres, but in the opinion of the governor and council, a larger park was desired and the purchase agreement was for 400. The price paid is $5,000, which takes but a small portion of the $50,000 appropriated by the legislature for the institution and it is the belief of the trustees that the money remaining at their disposal will be sufficient for the construction and equipment of the buildings.

"It was required in the legislative act authorizing the establishment of the sanatorium that it should be at least 800 feet above the sea level and the site selected is 1,600 feet. The buildings will stand upon a broad plateau, commanding a fine view and the purest of fresh mountain air, sweetened by the balm of the evergreen woods on the mountain slopes behind it.

"One of the features of the place is the magnificent water supply. It is far ahead of that found on any other place examined by the trustees in their long search. It will be taken from a stream fed by copious springs on the mountain and which has never been known to go dry. A dam will be constructed on this stream to form a great reservoir and it is estimated that the volume of water will be sufficient to maintain a flow through an eight-inch pipe the year round."

International Congress on Tuberculosis.

An International Congress on Tuberculosis, so notable as to constitute almost a world event, was held in Washington, D. C., from September 21 to October 12, 1908.

Under date of April 21, 1908, the State Board of Health, in a circular called the attention of the people of New Hampshire to the importance of this Congress, and suggested that both laymen and professional persons should become members, and thereby secure the four volumes of Transactions.

At this Congress, practically every country in the world was represented, and that by its ablest and most scientific investigators. A note from the Secretary-General of the Congress, received while this report is in press, states that the membership was 6,658. The Transactions will constitute practically a library on Tuberculosis, and will be an important addition to the literature of the world upon this subject.

New Hampshire was honored by the selection of Governor Charles M. Floyd to be one of the vice-presidents of the Congress.

Scarlet Fever.

During the period covered by this report, the board has issued and distributed extensively a bulletin on "Scarlet Fever: Its Restriction and Prevention." Space does not admit of its publication in this report. It embraces a discussion of

The cause of scarlet fever and how transmitted.
The period of incubation.
Prevalence of the disease; age of susceptibility.
Management of the disease.
Notification.
Duties of local boards of health.
Concerning the sick-room.
Disinfection and disinfectants, etc.

This bulletin will be sent to local boards of health and others upon application.

Legislative Investigation of the Work of the Board.

During the last session of the legislature, under date of January 16, 1907, the following resolution was adopted by the House of Representatives:

Resolved, That a committee of five members of this House be appointed by the Speaker to inquire into the work of the State Board of Health relative to the sale of unwholesome foods in this state. Said committee shall report its findings at an early date, together with any recommendation it deems advisable relating to additional legislation necessary for more effective control and regulation of unwholesome articles of food sold in the state.

The Speaker announced the committee called for in the above resolution, as follows: Fifield of Lee, Day of Concord, Aldrich of Keene, Arnold of Nashua, and McGregor of Whitefield.

Numerous sessions of this committee were held, and various persons from different parts of the state appeared before it, all of whom came for the purpose of showing the need of an inspector for constant work in the investigation of how certain supplies were handled, and for the inspection of slaughterhouses, meat markets, bakeries, and places where perishable foods are kept and sold.

Facts were brought out in the hearings that led the committee to believe that certain parties were putting upon the market meats of questionable character, and that certain food products were being manufactured under such unsanitary conditions as to be inconsistent with public health interests.

At the conclusion of these hearings, which were held at intervals from the first of February, the committee, under date of March 6, made a report, as follows:

Your committee would respectfully report that they have carefully examined into the work of the State Board of Health, in its collection and examination of food supplies at the State Library of Hygiene, and find that, while a large amount of work valuable to the state has been and is being done there, it has not the facilities for carrying out the provisions of the Public Statutes so effectually as is desired, on account of the lack of an inspector, who should be charged with certain duties not at present provided for.

No provision is now make for the inspection of slaughter-houses or of meat sold in the open market, a matter believed by your committee to be of great importance. An investigation shows that in addition to making frequent inspections of slaughter-houses and of meat offered for sale in our markets, an inspector would be of further service in the examination of other foods and drinks offered for sale; in the collection of samples for analysis at the State Laboratory of

Hygiene, and in aiding local boards of health of their duties in complicated cases.

Your committee would therefore respectfully recommend that this report be referred to the Committee on Public Health, with the suggestion that that committee take the whole matter under consideration at once, and that they report their conclusions, by bill or otherwise, as soon as may be.

The above report was accepted, and was referred to the Committee on Public Health, where the matter was subsequently taken up and considered, and that committee formulated and unanimously adopted and reported the following bill under date of March 21, 1907:

HOUSE BILL . . . . . NO. 533.

Introduced by Committee on Public Health.

STATE OF NEW HAMPSHIRE.

IN THE YEAR OF OUR LORD ONE THOUSAND NINE HUNDRED AND SEVEN.

AN ACT to Provide for a Food Inspector.

Be it enacted by the Senate and House of Representatives in General Court convened:

SECTION 1. The state board of health is hereby authorized to employ a suitable and competent person as an inspector, whose tenure of office shall be at the pleasure of the board, with a salary not exceeding twelve hundred dollars per year and actual expenses legally incurred, and who shall devote his entire time to the performance of the duties prescribed by law.

SECT. 2. It shall be the duty of the said inspector, acting under the direction of the state board of health, to make examinations as far as may be of the meat supplies sold in this state not guaranteed by government inspection, with reference to the detection of illegal, unsuitable, or diseased meats; the sanitary condition of slaughtering establishments and places where meats are kept; the methods of preparing meat products for sale, and such other investigations of meat products as may be authorized by the state board of health.

SECT. 3. The said inspector shall make examinations of general food products offered for sale in this state, for the purpose of detecting violations of the pure food laws, and he shall collect samples of suspected food products for analysis at the State Laboratory of Hygiene.

SECT. 4. The said inspector shall, under the direction of the state board of health, investigate local sanitary conditions in conjunction with and upon request of local boards of health in cases where such expert advice is deemed necessary by the state board of health.

SECT. 5. In addition to the specific duties herein prescribed, the said inspector shall perform such other duties in connection with public health matters as

the state board of health shall direct, and whoever hinders, obstructs, or in any other way interferes with said inspector in the performance of his duties, shall be fined not exceeding fifty dollars for the first offense, and one hundred dollars for each subsequent offense.

SECT. 6. An itemized account of all expenses incurred under the provisions of this act shall be rendered to and audited by the governor and council.

SECT. 7. For the purposes of carrying out the provisions of this act, a sum not exceeding twenty-five hundred dollars is hereby annually appropriated, and the governor is authorized to draw his warrant on the treasury for so much thereof as may be required, to be paid out of any money in the treasury not otherwise appropriated.

SECT. 8. This act shall take effect upon its passage.

The above proposed measure was immediately referred to the Committee on Appropriations, from which it was reported, with the recommendation that the bill ought to pass on April 3, 1907. The report was accepted, and the bill ordered to a third reading.

By reason of pressure of business at the very close of the session, this bill, with many others, was lost on Friday, April 5, in the last hours of the session, through a lack of a quorum.

The measure, by its friends, had already been presented to the Public Health Committee and the Committee on Appropriations in the Senate, by whom it had been favorably considered, and these committees were ready to recommend its passage without further consideration the moment it should reach the Senate, so that had a quorum been present in the House on Friday, the 5th of April, the day of final adjournment, the measure would undoubtedly have become a law.

The foregoing history is given to show that, after a most thorough investigation by several committees, and having been ordered to a third reading by the House, there was no question as to the need of an inspector as provided for in the measure.

The subject will come before the Legislature of 1909.

EXAMINATION OF EMBALMERS.

In 1899 the legislature enacted a law providing that all embalmers then in practice should register with the State Board of Health, and that all who entered upon the business after the passage of the act must first pass a written examination before the board.

Immediately following the passage of the law, 219 persons registered in accordance with its provisions, and, subsequently, many of these took the examination and became "licensed embalmers." Up to the time of this report, 216 applicants have passed the examinations.

Two or more examinations are held each year. The preliminary requirements for an examination are as follows:

PRELIMINARY REQUIREMENTS.

1. The applicant must have taken a regular course at a reputable school of embalming whose course of study is satisfactory to this board, and have had not less than a year and a half experience in active work with, or as, a practising embalmer; or

2. He must have had two years of active experience in practical work in embalming, with a New Hampshire licensed embalmer, and must present a certificate from the latter certifying that the applicant is qualified to perform the duties of a licensed embalmer; or

3. He must be a "Registered Embalmer," in this State, and have had not less than three years' experience as a practising embalmer; or

4. He must hold a certificate of "Licensed Embalmer" from the examining board of another state whose examinations are satisfactory to this board, and have had not less than one year's active work as a practising embalmer.

5. Application for examination must be made to the State Board of Health upon the blank form issued by the board, which must be filled out and signed by the applicant, and filed with the board *before* the day of the examination.

6. The application must be accompanied by a fee of five dollars, as provided in Section 7, Chapter 76, of the Laws of 1899.

Aside from questions relating strictly to embalming work, the examinations include also something of anatomy, physiology, bacteriology, communicable diseases, disinfection, and a knowledge of the rules and regulations governing the transportation of the dead.

The result of the operation of the law has been very marked, in that bodies are now better prepared for shipment—in fact, so thoroughly is the work done that bodies dead of any of the infectious or contagious diseases, with the exception of smallpox and bubonic plague, are now shipped to any part of the country. The processes in use by licensed embalmers are such as to destroy all danger of infection and to ensure the preservation of a body as long as desired.

Another marked advantage of the law is that incompetent persons are excluded, by reason of the examinations, from doing embalming.

One of the results of the law is a state organization of licensed embalmers, which meets annually, or oftener, at which times papers are read and matters relating to all phases of the subject are discussed.

In Relation to Fire Escapes.

At the last session of the legislature the following law was enacted:

IN RELATION TO THE FIRE ESCAPES ON CERTAIN BUILDINGS.

Chapter 137, Laws of 1907.

Section 1. No building three stories or more in height shall be let, leased or occupied as a hotel or transient lodging-house unless provided with a steel or wrought-iron ladder or stairway fire escape attached to the outer wall, and with platforms of like material of such size, shape and nearness to one or more windows of each story above the first as to render access thereto easy and safe.

Sect. 2. Such fire escapes shall reach within eight feet of the ground and the location of the exits thereto shall be designated by red lights between the hours of eight in the afternoon and six in the forenoon.

Sect. 3. If any person shall violate any of the provisions of this act, he shall be fined not exceeding five hundred dollars or imprisoned not exceeding six months, or both.

Sect. 4. This act shall take effect January 1, 1908.

The above law was printed by the State Board of Health and was sent to all local boards of health in the state, with a letter asking for information concerning such buildings in their respective towns as would come under the provisions of the law, as follows:

Concord, N. H., July 14, 1908.

To the Board of Health:

Gentlemen: We are enclosing herewith a few copies of a circular relative to the law concerning fire escapes, issued by the State Board of Health under this date, and would respectfully ask your board to see that all parties to whom the law is applicable receive a copy of the circular referred to.

A sufficient number of copies for general distribution will be forwarded promptly upon request.

It is important that the law be enforced in the interests of life and property, and we trust that your board will take an active interest to see that all persons responsible under the law are notified of its provisions, and that they comply therewith as soon as practicable.

Very truly yours,

Irving A. Watson,
Secretary.

The question having been raised as to what was meant by "three stories," the following correspondence, which is self-explanatory, is herewith given:

Concord, N, H., July 6, 1908.

Hon. E. G. Eastman, Attorney-General, Exeter, N. H.:

Dear Sir: Will you have the kindness to give this board your interpretation of the words "three stories" which occur in Section 1, Chapter 137, of the Laws of 1907, copy of which is herewith inclosed.

It appears to me that the law was designed to protect against fire persons on the third floor, or above, of buildings.

There are many so-called two-story buildings which have a third floor with a French, pitch, or other kind of roof, and on which floor there are rooms occupied as bedrooms, as you well know. The question is, Does the law cover such a condition, or is it applicable only to such buildings as have three or more floors below the roof floor?

We should like your interpretation of this point of the law. . . .

Very truly yours,

Inclosure. (Signed) IRVING A. WATSON,
Secretary.

ATTORNEY-GENERAL'S OFFICE, EXETER, N. H., July 7, 1908.

Irving A. Watson, M. D., Concord, N. H.:

MY DEAR SIR: Your favor of July 6 asking me for my interpretation of "three stories" which occurs in Section 1, Chapter 137, Laws of 1907, is received. I have already examined this question and given an opinion to the effect that two-story buildings which have a third floor with a French, pitch or other kind of roof, occupied for living and bedrooms, come within the provisions of the law named. The object and purpose of the statute is to protect the lives of people who occupy such buildings, and in the case mentioned, the third floor exists to the same extent as it would if there had been another floor above it in the roof.

Respectfully yours,
(Signed) EDWIN G. EASTMAN,
Attorney-General.

A circular containing the law and the above correspondence relative to its interpretation was sent to all local boards of health, with the request that a copy of the circular be placed in the hands of each person to whom the law would apply in their respective jurisdictions.

We have ascertained that the law has been carried out in many localities, but we have no information as to whether or not it has been enforced in every town.

REPORTING WHOOPING COUGH.

MANCHESTER, N. H., November 28, 1907.

Dr. Irving A. Watson, Secretary State Board of Health, Concord, N. H.:

DEAR SIR: At a meeting of this board, held last evening, it was

Resolved, That whooping cough should be included in the list of contagious diseases required to be reported, and to request the State Board of Health to add this to the list of contagious diseases.

Yours respectfully,
(Signed) BOARD OF HEALTH,
By Wm. K. Robbins,
Clerk.

After careful consideration of the subject, the conclusion was reached that the State Board of Health probably did not have authority to direct that all cases of whooping cough should be reported to local boards of health, but that the board did approve of such reports being made under a regulation established by the local boards of health, the latter having undoubted authority under the law to establish such regulations. Attention was called to the fact that whooping cough was one of the diseases that the International Conference of State and Provincial Boards of Health of North America has placed in the list of maladies that might properly be reported to local boards of health. It would seem that in the state of New Hampshire, boards of health that deem it advisable or necessary might establish a regulation under the provisions of Section 1, Chapter 108 of the Public Statutes, requiring notification in all cases of whooping cough.

The New Hampshire Sanitary Bulletin.

For eight years the *New Hampshire Sanitary Bulletin* has been published quarterly, in editions ranging from 5,000 to 10,000 copies, which have been extensively distributed among the people of the state. An exchange is also made with similar publications in other states, and there is a demand for it from individual workers along public health lines.

The *Bulletin* receives large credit, and some of its articles have been extensively copied by publications in other states and countries. It goes into every town in New Hampshire, and in some its list is large.

The board receives many letters attesting to the value of its instruction, and we believe that it is doing a great deal of good in the state, much more, probably, than is accomplished by a biennial report, which cannot be so widely distributed.

Public Health Laws.

Early in 1908 the State Board of Health compiled and published in pamphlet form "Public Health Laws of the State of New Hampshire, Containing the Principal Laws of the State relating to the Public Health (Exclusive of Food and Drugs Law)." This was done to meet the demand for such a publication. It consists, including index, of 76 pages, and the edition was 2,000. A copy has been furnished every health officer in the state, to all registered and licensed physicians, to embalmers, town clerks, and to any others who have to do with the execution of the laws embraced in the compilation.

Only a small part of the edition remains.

Publications for Distribution.

The following named publications, in pamphlet form, may be had by any citizen of the state upon application. Thousands of copies have already been distributed:

The *New Hampshire Sanitary Bulletin.*
Consumption: Its Prevalence, Cause, Restriction and Prevention.
Diphtheria: Its Restriction and Prevention.
Scarlet Fever: Its Prevalence, Restriction and Prevention.
Typhoid Fever: Prevalence, Cause, Restriction and Prevention.
Pure Food and Drugs Law of New Hampshire.
Standards of Purity for Food Products.
Disposal of Household Waste at Summer Resorts, Encampments and Farm-Houses.
Economical Disposal of Sewage, with Purification, by Small Communities.
Public Health Laws of the State of New Hampshire.

Of some of the above, the editions have already been largely distributed, but copies will be furnished in all instances until exhausted.

WATER SUPPLIES OF TOWNS AND CITIES.

EXAMINATION OF WATER SUPPLIES.

By Charles D. Howard, *Chemist.*

During the period from October 1, 1906, to September 1, 1908, one year and eleven months, a total of 1,580 samples of water have been examined at the State Laboratory of Hygiene. Of this number 532 represent (a) samples from public supply systems furnishing towns or villages, (b) sources of semi-public character, such as the supplies of schools, public institutions, manufactories, etc., also roadside wells and springs resorted to in some measure by the public. The balance, 948 samples, was taken from private sources, the analyses being made either at the request of physicians or boards of health, or as a result of the approval of special applications filed by private individuals.

Of the 235 towns in the state, 86 now have water-supply systems, numbering in all 101 supplies, of which 49 are owned by the town or by a precinct, and 53 by private individuals or corporations. Of these 102 supplies, 28, or 27.4 per cent., are derived from ponds; 19, or 18.6 per cent., are from streams; 17, or 16.6 per cent., from wells; 30, or 29.4 per cent., from springs; and 8, or 7.8 per cent., from combinations of these sources. Several of the pond supplies are in reality impounded streams or low areas with abundant springs whose flowage is collected in an excavated basin.

Since the last issue of this report, this department has information of the construction of three new public supply systems, one by the town of Hancock, another by the town of Charlestown, and a third represented by that of the Hampton Water Company, the latter supplying the beach territory of the towns of Hampton and North Hampton. A fourth supply recently installed and not hitherto appearing on these records, is that of the village of Contoocook. A number of other supplies have also recently been extended or improved, notably those of Lebanon, Franklin and Goffstown.

The supply of the Hampton Water Company is obtained from driven wells. Analyses made thus far indicate not only freedom from pollution

but a supply of very fair quality. The latter is especially true if we compare it with the average beach well supply, the water of which is not only inclined to be hard and charged with mineral salts but is not infrequently open to suspicion of pollution. This is emphatically the case with most of the private well waters in use at the lower end of Hampton Beach. An inspection of conditions at this resort, made during the season of 1908, revealed a deplorable state of affairs, shallow sand wells, privies and cess-pools being found thickly jumbled together without any apparent regard for sanitary considerations. A new sewerage system is now being installed and another season should see a radical improvement.

The quality of the Lebanon supply has been recently improved through the installation of a system of mechanical filtration. This plant is fully described elsewhere in this report.

During 1906 an inspection was made of the Pettee water system at Durham. This supply has recently been augmented by the addition of some new wells. The soil of the locality is of a heavy clayey nature and the ground water is naturally more highly charged with mineral salts than is the case with the average New Hampshire well supply. The present quality of this supply is considered fair.

Formerly the village of Suncook and the town of Goffstown shared honors over drinking the two most highly colored supplies in the state. Recently, however, the Goffstown supply has shown a marked improvement in this respect. The supply of the Suncook Water Company, while free from sewage pollution, contains such a large amount of dissolved peaty matter and such a marked color as to render it highly unattractive. Certainly the daily use for drinking purposes of such a supply should not be aquiesced in, if the difficulties in the way of securing a better are not insurmountable.

The city of Somersworth possesses an excellent system of filtration, but is somewhat handicapped on account of being dependent upon a poor raw water supply. Not only is the Salmon Falls River sewage polluted, but the discharge therein of manufacturing waste has resulted in a condition that demands the taking of some measures for relief if further menace to the quality of this water supply is to be avoided.

During the past two years there has been no serious depreciation observed in the case of any of the public supplies; neither has there been any epidemic of disease the origin of which could be attributed to the quality of such. During 1908 a number of cases of typhoid fever occurred in the city of Manchester, the epidemic being confined mainly to the operatives of a shoe manufactory. In this instance the ice used in the drinking water at this shop was found to be polluted, and a number of

minor sources of water supply in the neighborhood proved to be contaminated. Analyses of samples taken from the Piscataquog River, said to be used to some extent for drinking purposes, indicated a very poor quality.

During the summer of 1908, the quality of the Claremont town supply being criticised by the consumers, an inspection was made of this system, and recommendations submitted for its improvement. Analyses showed no serious deterioration of quality, although some unclean reservoirs and the pasturage of cattle on the water-shed were details found to need remedying.

As usual, some complaint has arisen during the warm months based upon the development of odors in the case of some of the pond supplies. This condition is attributable to the growth of algae. The copper sulphate treatment, first suggested by Dr. G. T. Moore, is easily applied and has been found very successful. Nevertheless this expedient does not seem to have been utilized to any extent as yet by those in charge of water supplies. (See report on the application of this treatment to the Hanover supply, by Dr. H. N. Kingsford, p. 159, Vol. 18, 1903–'04.)

A summary of the results of the examination of supplies classed in this report as public shows:

Examinations indicating good water in all respects	343
Indicating an abnormal, inferior, or polluted condition (including all samples showing B. coli or lead though otherwise good)	189
Total examinations of public supplies	532

The quality of the 102 public supply systems as observed during the past two years is shown as follows:

Supplies classed as of good quality	83, or 81.3%
Classed as variable because of periodic use of contaminated auxiliaries	7, or 6.8%
Classed as inferior or polluted	12, or 11.7%

The examination of waters from private sources continues to be a very large item of the work of this laboratory. The demand for this service, first extended in a limited way for the benefit of physicians and boards of health, and for the occasional accommodation of individuals, has gradually grown to embarrassing proportions. In short, the average private citizen has come to regard it as his inalienable right to have his drinking

supply analyzed at the public expense, not only once but as often as he may feel so disposed. The "sickness" requirement in connection with regulations designed to limit this service seems to be easily satisfiable, though as this department has become more critical in considering applications, a favorite procedure seems to be in having the request come through a member of the local health board or the family physician.

Unfortunately many of these analyses are totally unnecessary and serve no very good purpose, either because there is no chance for any legitimate question as to the purity of the supply, or else because the commonest means for its protection have not been taken. In a very large proportion of the cases where the analysis is reported as indicating an inferior or polluted condition, we are satisfied that the trouble is in that the well or spring has not been receiving proper care or has not been cleaned for some time. The result is that we are repeatedly applied to for reëxaminations after the completion of improvements the necessity of which should, in many cases, have been self evident, and which, of course, should properly have been made before the collection of the first sample.

Following is a summary of the results of examinations of private supplies:

Examinations representing water of good quality	308, or 32.4%
Doubtful, or indicating poor condition of supply	221, or 23.3%
Organically polluted	228, or 24.2%
Organically pure but containing an excessive quantity of lead	191, or 20.1%
Total examinations	948

A consideration of the above data shows that approximately one fifth of the total number of samples representing private sources contained an excessive quantity of dissolved lead. Were it not for this contamination (not considering the question of zinc) over 50 per cent. of the total number examined would have been reported as pure. That nearly 50 per cent. were found organically inferior should not be accepted as any indictment of the natural quality of our ground-water supplies, for the reason that a large proportion of these would have been of good quality under proper care and were readily susceptible of being so rendered. An appreciable number of the analyses represent second examinations of the same polluted supply; finally, a considerable proportion of the samples classed as inferior were fairly free from organic matter and doubtless at present safely usable, although not entitled to the designation of "good."

We are not infrequently asked our opinion as to the advisability, or the risk involved, in the use of lead pipe as a conducting medium. In such connection the following data, representing examinations of lead-conducted waters for the past two years, ought to prove instructive:

Total examinations for lead	443
Showing 0.045 parts or more	225, or 50.8%
Showing 0.025 to 0.045 parts	53, or 11.9%
Less than 0.025 parts to a trace or none . .	165, or 37.3%

Accepting these figures as of general application in New Hampshire, and also accepting 0.045 parts lead as the safety limit, it will be seen that an average of one out of every two lead-conducted supplies is seriously liable to prove deleterious to the health of the users. But we have no present satisfactory evidence that a water showing up to 0.045 parts is usable with safety. On the contrary there seems very good reason for believing that certain individuals are susceptible to a less amount; so that if we consider the total number of examinations revealing appreciable quantities of lead, the proportion of dangerous or very questionable lead-conducted supplies is raised to nearly 63 per cent., or nearly two out of three.

Past experience shows that the deductions from analyses made with a view of determining the probable action of any given supply on lead pipe are practically worthless, or cannot be depended upon as an index of the permanent character of the water. It would seem therefore that he who deliberately installs the lead system for his drinking supply, because it is easier or more permanent, gambles not only with his own health but with that of his family and of his descendants.

It is admitted that the ideal service pipe remains yet to be discovered. The form at present being installed in a majority of cases is galvanized iron, although it is recognized that this is prone to rust out with certain waters, notably those that are hard or are charged with appreciable quantities of air or carbon-dioxide. In supplies containing notable quantities of nitrates, solution of the zinc is accompanied by reduction of such to nitrites and ammonia. Waters of this class after passing galvanized pipe will show a greasy surface, while any water carrying an appreciable quantity of zinc will deposit a noticeable white coating upon the surface of cooking utensils. Such waters are also apt to be faintly milky in appearance—a turbidity easily differentiated from that attributable to suspended clay or forms of organic pollution, by the addition of a trace of acetic acid, when in the presence of zinc the water promptly becomes clear.

Other forms of pipe available are tin-lined lead, tin-lined iron and

cement-lined iron, also wrought steel, which is supposed to have an advantage over plain wrought iron. A proper grade of the first is relatively expensive, but if properly put together so as to leave no unprotected surfaces, its use will prove satisfactory. Cement-lined iron is now used as a service pipe to an appreciable extent and with good success by a number of Massachusetts towns and cities,* although this form has not been found altogether free from a tendency to rust.

Following are reports of water-supply examinations alphabetically arranged by cities and towns. All results are given in parts per 100,000.

ACWORTH.—No public water supply. Families get their water from wells or from springs, and lead pipe is used as a rule. One private supply examined was found to contain an excess of lead.

ALBANY.—There is no water supply other than wells and springs. The wells are mostly dug; a few are driven.

ALEXANDRIA.—No public supply. Water is obtained from private wells and springs.

ALLENSTOWN.—(See Pembroke.)

ALSTEAD.—The soil in the valley in which this town is situated is sandy loam of little depth; subsoil, gravel and cobble; on the hills, clayey soil, while the subsoil is closely packed, clayey gravel. Three or four families here and there have piped springs or shallow wells for their water supply. At East Alstead is one well to which the public have access more or less.

Chemical Examination of Water from Stream, Proposed Public Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
5455	1908 July 27	None	S. fine	S. earthy	0.10	3.9	2.5	.0016	.0034	.0100	.0000	.25	1.0	....	..

Three private supplies examined were found to be organically pure, though two of these contained lead.

* Thirty-seventh Annual Report Mass. State Board of Health, p. 197.

ALTON.—The Alton & Alton Bay Water Works Company, established in 1892–'93, supplies about 100 families (90 per cent. of the population), with water from a spring, except in dry weather, when it is pumped from Lake Winnipesaukee to a reservoir of 150,000 gallons' capacity.

Chemical Examination of Water from Faucet of Supply of Alton & Alton Bay Water Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
782	1902 Sept. 6	None	S. earthy	None	0.0	7.40	3.50	.0000	.0030	.0220	.0000	.27	3.1	....	..
1337	1903 July 16	Slight	Con. fine	S. veg.	0.15	4.70	3.00	.0000	.0000	.0000	.0000	.15	2.6	....	..
1936	1904 May 9	Slight	None	V. slight	0.0	5.50	3.00	.0010	.0012	.0050	.0000	.13	2.2	....	..
2109	June 28	Slight	None	S. earthy	0.0	7.40	3.80	.0000	.0018	.0000	.0000	.15	3.6	...	..
2655	1905 Jan. 23	None	None	S. earthy	0.1	5.8	3.8	.0000	.0014	.0100	.0000	.12	2.2	....	..
2965	July 7	Slight	Con. floc.	S. foul	0.30	5.7	3.7	.0000	.0012	.0000	.0000	.12	2.0	....	..
3010	July 24	Slight	Slight	Earthy	0.1	3.3	1.1	.0010	.0070	.0000	.0000	.15	0.4	....	..
3023	July 27	V. slight	None	None	0.1	5.3	3.2	.0016	.0028	.0050	.0040	.17	2.4	....	*
3058	Aug. 7	V. slight	Slight	Much vg	0.6	4.8	2.2	.0000	.0114	.0050	.0000	.17	1.1	....	*
3277	Oct. 31	Sl. opal	V. slight	Much vg	0.2	4.7	4.2	.0014	.0034	.0180	.0000	.22	2.6	....	..
3914	1906 Aug. 29	V. slight	V. slight	None	0.10	2.2	1.2	.0022	.0078	.0100	.0000	.15	0.9	....	*
4155	Nov. 14	None	None	None	0.05	5.3	3.6	.0014	.0034	.0050	.0000	.10	3.2	....	..
4404	1907 Apr. 5	None	None	S. veg.	0.13	3.5	1.9	.0016	.0042	.0000	.0000	.15	1.9	....	*
4898	Sept. 24	V. slight	V. slight	None	0.30	3.0	2.0	.0012	.0078	.0000	.0000	.08	1.9	....	..
4912	Oct. 2	None	V. slight	V. m. vg	0.00	9.6	8.0	.0010	.0012	.0300	Ft.tr.	2.51	3.2	...	*a*
5167	1908 Mar. 13	None	None	S. earthy	0.00	5.0	3.0	.0004	.0040	.0050	.0000	.21	2.6	....	..

* B. coli present.
a Town pump.

Chemical Examination of Water Supplies in Alton Camp Ground.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
3973	1906 Sept. 12	None	V. slight	Veg.	0.1	.....	....	.0010	.0048	.0050	.0000	.10	1.2	....	*b*
3985	Sept. 18	None	None	None	0.0	.....	....	.0006	.0010	.0050	.0000	.60	2.4	....	*c*

b Tap from spring.
c Camp Ground well.

One private supply examined was found to be polluted.

Amherst.—A private supply, inaugurated in 1837, furnishes water from wells on hill dug from five to twenty feet deep. The service and main pipes are of lead. Most of the families in the village are supplied from this source, but there are many private wells besides.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
422	1902 Mar. 3	None	None	None	0.0	.....	....	.....	.....	.....	.....	...	1.2	.1600	...
423	Mar. 3	None	None	None	0.0	.....	....	.....	.....	.....	.....	...	1.2	.1100	...
424	Mar. 3	None	None	None	0.0	.....	....	.....	.....	.....	.....	...	1.4	.0265	...
3093	1905 Aug. 17	None	Slight	S. earthy	0.00	5.5	3.7	.0000	.0000	.0100	.0000	.15	1.5	.070	*a*
3504	1906 Mar. 7	None	None	V. slight	0.00	4.5	3.8	.0008	.0044	.0100	.0000	.20	1.1	.....	*a*
3109	1905 Aug. 22	None	Slight	S. foul	0.00	3.6	2.2	.0010	.0020	.0080	.0000	.15	....	.020	*b*
3505	1906 Mar. 7	None	None	None	0.00	4.1	2.1	.0008	.0044	.0100	.0000	.20	0.9	.020	*b*
3085	1905 Aug. 15	None	None	None	0.00	5.8	3.0	.0006	.0008	.0000	.0000	.05	1.8	.010	*c*
3326	Dec. 6	None	None	None	0.20	6.5	3.9	.0010	.0066	.0050	.0000	.29	0.6	.....	*c*
3273	Oct. 30	None	None	None	0.05	5.3	2.9	.0010	.0016	.0050	.0000	.07	1.6	.....	*d*
4910	1907 Oct. 30	None	None	Foul	0.00	3.7	3.2	.0014	.0026	.0050	.0000	.17	1.2	.09	**a*
5177	1908 Mar. 18	None	None	None	0.00	3.9	2.0	.0002	.0008	.0040	.0000	.19	.4	.04	*b*

a Spring supply of Miss Abby Melindy.
b Spring supply of J. C. Taylor.
c Spring supply of Mrs. Elizabeth Nichols.
d Spring supply of Herbert H. Belden.
* B. coli present.

Four samples from private supplies were received for analysis, two of which were found to be of good quality and two polluted.

ANDOVER.—Water is furnished to about 30 families in Andover Center by C. E. Carr, from three reservoirs supplied by eight springs on the side of Ragged Mountain. The watershed is partly wooded and partly cleared; no inhabitants. The springs are dug from six to fifteen feet deep, and the water flows by gravity through about two miles of mains, one third iron and two thirds lead pipe. The service pipes also are some lead and some iron. There are many private wells within the area of this supply. A part of the families of West Andover are supplied from springs on the west side of Ragged Mountain. Cilleyville is supplied from private wells. East Andover and all the rest of Andover also from wells, except five families which have water from springs.

Chemical Examination of Water Supplied Andover Center.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
841	1902 Oct. 9	None	Slight	None	0.0	7.00	2.90	.0000	.0000	.0000	.0003	.12	2.2	....	..
855	Oct. 12	None	None	None	0.0	5.50	3.40	.0000	.0000	.0000	.0000	.12	2.3	....	..
3078	1905 Aug. 14	None	None	None	0.00	6.4	3.7	.0000	.0010	.0100	.0000	.12	1.9	....	..
4427	1907 Apr. 9	None	None	None	None	2.5	1.8	.0008	.0004	.0100	.0000	.10	1.2	....	..

Of the ten private supplies examined, three were found to be good, four good except for presence of excessive lead, one of poor quality and two polluted. One sample showed an appreciable quantity of zinc.

ANTRIM.—A water supply was installed by the town in 1893, the source being a pond of about 16 acres in area, and of an average depth of 16 feet. It is a gravity system, employing three miles of pipe, wooden main, and iron service pipes. Ninety per cent. of the population take this water.

Chemical Examination of Water from Tap of Town Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
	1901														
95	July 30	None	S. floc.	Strong veg.	0.4	3.40	.80	.0000	.0242	.0000	.0000	.11	....	....	..
96	July 30	None	Much floc. veg.	Dec. vg. & musty	1.1	4.30	2.20	.0036	.0180	.0000	.0000	.12	....	....	*
97	July 30	None	Slight	Decided musty	0.3	4.50	1.80	.0074	.0150	.0080	.0000	.12	....	....	..
98	July 30	None	Slight	Decided aromat.	0.4	3.20	1.20	.0028	.0184	.0000	.0000	.13	....	....	..
177	Sept. 20	None	Slight	Faint veg.	0.25	3.50	.60	.0028	.0180	.0000	.0000	.09	...	....	..
178	Sept. 20	None	Slight	Faint veg.	0.25	4.40	.90	.0026	.0180	.0000	.0000	.09	....	....	..
	1904														
1950	June 14	Slight	V. slight	Dec. foul	0.15	2.60	.90	.0000	.0028	.0000	.0000	.05	.9	...	..
	1905														
2663	Jan. 28	None	None	V. S. vg.	0.15	4.2	2.3	.0236	.0086	.0200	.0000	.12	1.4	....	..
2963	July 7	None	Slight	S. earthy	0.25	2.50	0.8	.0000	.0024	.0000	.0000	.12	0.6	....	*
3272	Oct. 31	None	None	None	0.20	3.7	1.3	.0014	.0098	.0050	.0000	.07	0.4	....	..
	1906														
3845	Aug. 15	None	None	None	0.1	2.5	1.0	.0024	.0140	.0050	.0000	.05	0.7	...	..
4161	Nov. 15	V. slight	V. slight	Slight	0.10	3.0	1.5	.0016	.0094	.0050	.0000	.05	0.4	....	..
	1907														
4401	April 4	None	V. slight	Musty	0.20	3.5	1.5	.0066	.0060	.0000	V. ft. tr.	.20	1.2	....	..
4896	Sept. 25	None	None	None	0.00	1.8	.6	.0002	.0054	.0000	.0000	.07	0.4	...	..
	1908														
5168	Mar. 13	None	None	None	0.10	3.0	1.4	.0150	.0060	.0060	.0000	.26	0.4	....	..

* Colon B. present.

An investigation of eight samples representing private sources showed three to be of good quality, two doubtful and three polluted.

ASHLAND.—The town operates a public water supply derived from a pond.

Chemical Examination of Water from Tap of Town Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
840	Oct. 9	None	None	Veg.	0.25	6.50	1.00	.0000	.0064	.0000	.0000	.07	1.00	...	..
1426	1903 Aug. 10	None	V. slight	Dec. vg.	0.3	7.40	2.10	.0000	.0084	.0000	.0000	.07	1.60	...	..
1943	1904 May 9	None	None	None	0.15	4.00	1.10	.0000	.0014	.0000	.0000	.15	1.10	....	*
2659	1905 Jan. 24	None	None	V. S. vg.	0.1	5.5	1.7	.0054	.0054	.0050	.0000	.12	0.7	....	..
2964	July 6	None	None	None	0.25	3.5	1.7	.0000	.0104	.0000	.0000	.07	0.7	....	*
3274	Oct. 31	None	None	S. veg.	0.20	3.4	2.0	.0014	.0060	.0050	.0000	.07	0.7	....	..
3847	1906 Aug. 15	V. slight	V. slight	Slight	0.30	3.8	1.7	.0018	.0134	.0050	.0000	.07	1.2	....	..
4151	Nov. 13	V. slight opal	V. slight	Sl. veg.	0.20	4.5	2.1	.0014	.0064	.0050	.0000	.07	1.2	....	..
4162	Nov. 15	Slight	Consid. floc.	Sl. veg.	0.20	4.0	....	.0030	.0264	.0050	.0000	.07	1.2	....	..
4403	1907 Apr. 5	Slight	Slight	M. veg.	0.15	3.2	1.4	.0026	.0068	.0200	.0000	.06	0.9	....	*
4930	Oct. 7	None	None	None	0.50	5.0	3.1	.0046	.0104	.0040	.0000	.14	1.9	....	..
5138	1908 Feb. 19	None	None	Sl. woody	0.20	3.7	2.3	.0012	.0076	.0100	.0000	.25	1.2	...	..
5175	Mar. 18	None	None	Sl. earthy	0.20	1.7	1.0	.0004	.0048	.0060	.0000	.19	0.4	....	..

* Colon B. present.

Seven private supplies were examined, two being found good, two others good but for an excess of lead while three were polluted.

ATKINSON.—No public supply. Water is obtained from private wells. One private supply examined was found to be of good quality.

AUBURN.—No public water supply. There is one private supply from which seven families are furnished, and one public watering trough for the town.

Chemical Examination of Water from Well Supplying Auburn.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
	1905														
3027	July 27	None	None	None	0.00	4.9	3.2	.0014	.0014	.0000	.0000	.25	1.6	....	..
3280	Nov. 1	None	S. ferrug.	S.earthy	0.05	3.0	1.0	.0014	.0024	.0050	.0000	.30	0.9	....	*
	1906														
3851	Aug. 16	Consid. ferrug.	S. ferrug.	Earthy	0.08	4.1	3.4	.0040	.0028	.0100	.0001	.40	2.3	....	..
4163	Nov. 15	Sl. opal	Slight	M. veg.	0.50	6.0	3.4	.0010	.0134	.0050	.0000	.07	1.2	....	..
	1907														
4410	Apr. 8	Mod.	Mod. ferrug.	Slight	0.40	2.2	1.5	.0006	.0072	.0050	.0000	.28	1.2	....	..
	1908														
5173	Mar. 18	None	V. slight	S.earthy	0.20	2.2	.9	.0002	.0026	.0060	.0000	.37	0.4	....	..

* Colon B. present.

Of the two private supplies sampled one proved of good quality, the other unfit for drinking.

BARNSTEAD.—Four private supplies investigated showed one good, one good but for dissolved lead, one of doubtful character and one polluted.

BARRINGTON.—One of two private supplies examined was found to be unfit, the other of good quality.

BARTLETT.—The public water supply, owned by the village precinct, was installed about the year 1888 by the Bartlett Water Company. The source is a stream having a watershed of two square miles, wooded land, no inhabitants.

Chemical Examination of Water from Tap of Bartlett Water Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
880	1902 Oct. 21	None	None	V. S. vg.	0.01	4.90	.80	.0000	.0020	.0000	.0000	.07	.6	....	..
1339	1903 July 15	None	None	S. veg.	0.15	5.30	1.20	.0000	.0020	.0000	.0000	.10	0.9	....	..
1991	1904 May 24	None	None	V. slight	0.05	5.40	1.90	.0000	.0014	.0000	.0000	.05	1.2	....	..
2677	1905 Jan. 31	None	None	None	0.00	5.0	2.6	.0000	.0000	.0000	.0000	.10	1.1	....	..
2978	July 11	None	V. slight	None	0.12	4.0	2.0	.0006	.0006	.0000	.0000	.05	0.7	....	..
3286	Nov. 9	None	V. slight	None	0.15	2.7	2.0	.0010	.0048	.0050	.0000	.10	0.3	....	..
3852	1906 Aug. 16	None	V. slight	None	0.08	4.0	2.9	.0010	.0080	.0050	.0000	.12	1.0	....	..
4179	Nov. 21	None	None	None	0.10	3.5	1.9	.0008	.0048	.0050	.0000	.05	0.4	....	..
4428	1907 Apr. 10	None	None	None	0.12	2.5	1.9	.0008	.0014	.0050	.0000	.05	0.9	....	..
4928	Oct. 7	None	None	None	0.05	2.3	.8	.0010	.0022	.0040	.0000	.10	0.4	....	..
5201	1908 Apr. 1	None	V. slight	Earthy	0.05	3.7	1.5	.0002	.0018	.0200	.0000	.11	0.4	....	..
5428	July 20	None	Consid. floc.	Earthy	0.05	3.3	2.5	.0014	.0026	.0100	.0000	.07	0.4	...	*a*
5429	July 20	V. slight	Consid. floc.	S. earthy	0.05	2.8	2.0	.0012	.0008	.0080	.0000	.08	0.4	....	**b*

* B. Coli present.
a South Branch, Albany Brook.
b East Branch, Albany Brook.

BATH.—Water is supplied by two private companies from springs, dug in a clay soil. The water runs by force of gravity, with about two miles of iron main and service pipes. There are 12 or 15 wells within the area supplied.

Chemical Examination of Water from Faucet of Bath Aqueduct Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
802	1902 Sept. 18	None	None	None	0.0	7.30	3.60	.0000	.0014	.0150	.0002	.15	3.6	....	..
2999	1905 July 20	None	Slight	S. earthy	0.05	6.2	4.9	.0000	.0014	.0200	.0000	.15	3.2	....	*
4418	1907 April 9	None	None	Slight	0.00	10.5	7.6	.0008	.0004	.0000	.0000	.25	5.3	....	..
4906	Sept. 30	None	S. earthy	S. earthy	0.05	.....	....	.0002	.0010	.0050	.0000	.26	5.3	....	..
5180	1908 Mar. 20	None	None	None	0.05	6.1	3.5	.0010	.0010	.0300	.0000	.29	3.2	....	..

* Colon B. present.

BEDFORD.—No public supply. Water is obtained wholly from private wells and aqueducts on the farms. The single private supply investigated proved to be polluted.

BELMONT.—The Belmont Water Works, owned by the town, were installed in 1893. Water is obtained from wells, supplemented by a stream in dry seasons. There is a pumping station for use in dry seasons, by which water is pumped from a stream to the reservoir. There is also a private supply in the town. The pipes are of wood mains, and galvanized iron service.

Chemical Examination of Water from Tap of Belmont Water Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
864	1902 Oct. 15	None	None	None	0.0	5.60	3.00	.0000	.0030	.0000	.0000	.12	3.0	..	....
1327	1903 July 13	Slight	Slight	Dec. foul	0.05	5.10	2.60	.0014	.0012	.0300	.0000	.25	1.2	..	*a*
1328	July 13	None	None	V. slight	0.05	4.60	2.00	.0000	.0010	.0300	.0000	.20	1.5	..	...
1329	July 13	None	None	None	0.05	4.30	2.90	.0000	.0000	.0150	.0000	.20	1.2	..	....
1931	1904 May 7	None	None	Slight	0.0	2.50	.90	.0008	.0034	.0000	.0000	.125	.7	..	....
2162	July 18	None	None	None	0.1	3.20	2.10	.0000	0000	.0000	.0000	.075	1.9	..	....
2481	Oct. 25	None	V. S. fine	S. veg.	0.30	4.3	2.3	.0000	.0014	.0000	.0000	.10	1.8	..	....
2482	Oct. 25	None	Con. floc.	V. slight	0.00	3.3	2.0	.0000	.0000	.0000	.0000	.07	1.9	..	....
2518	Nov. 7	None	Con. floc.	Dec. vg.	0.25	4.6	2.7	.0010	.0058	.0000	.0000	.12	1.9	..	*a**
2560	Nov. 28	None	None	None	0.10	4.0	3.2	.0000	.0000	.0000	.0000	.17	0.9	..	....
2657	1905 Jan. 23	None	None	Slight	0.20	4.4	2.7	.0000	.0000	.0100	.0000	.15	0.7	..	....
2986	July 17	None	None	Slight	0.20	4.5	2.7	.0000	.0010	.0100	.0000	.15	0.7	..	*
3279	Nov. 1	None	V. slight	Veg.	0.20	5.1	3.6	.0014	.0058	.0050	.0000	.22	0.7	..	...
3636	1906 May 24	None	V. slight	S. veg.	0.25	4.8	2.6	.0010	.0060	.0100	.0000	.10	....	..	*
3651	May 30	.....	.....	.....	....	....	....	.....	.....	.....	.....	....	....	..	*
3856	Aug. 17	None	V. slight	None	0.20	5.0	2.7	.0010	.0044	.0050	.0000	.10	1.1	..	....
4158	Nov. 14	V.S. opal	Slight	Veg.	0.15	6.0	3.5	.0014	.0042	.0050	.0000	.05	1.2	..	....
4416	1907 Apr. 8	None	None	Earthy	0.15	2.4	1.5	.0012	.0026	.0100	.0000	.17	0.9	..	....
4907	Sept.30	None	None	None	0.35	4.3	2.8	.0012	.0104	.0050	.0000	.32	1.2	..	*
5189	1908 Mar. 25	Consid.	M. earthy	Slight	0.40	3.0	1.5	.0002	.0114	.0020	.0000	.12	0.4	..	....

a Stream at pumping station. The quality of this water varies according to the use of the auxiliary stream supply.
* Colon B. present.

One private supply examined was found in good condition.

BENNINGTON.—No public supply. The Bennington Water Works Company, a private company, in 1900 installed a system supplied from springs, with a supplementary supply from a stream.

Chemical Examination of Water from a Faucet of the Bennington Water Works Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
751	1902 Aug. 27	None	V. slight	None	0.15	6.50	2.80	.0000	.0000	.0000	.0000	.10	1.5	....	..
1334	1903 July 15	None	None	V. slight	0.1	3.70	2.30	.0000	.0030	.0000	.0000	.05	1.5	.. .	..
341	July 16	None	None	Veg.	0.1	3.40	2.70	.0000	.0034	.0000	.0000	.05	2.0	....	..
2262	1904 Aug. 9	Very marked	Much floc. red	None	0.6	6.10	1.70	.0000	.0034	.0050	.0000	.10	1.4	....	*
3069	1905 Aug. 9	None	Slight	S. earthy	0.05	4.5	2.3	.0000	.0026	.0050	.0000	.10	1.2	....	..
3287	Nov. 8	None	None	None	0.00	5.4	3.9	.0010	.0014	.0050	.0000	.12	0.9	....	..
3885	1906 Aug. 23	None	None	Slight	0.05	4.2	3.6	.0010	.0032	.0050	.0000	.12	1.5	....	..
3960	Sept. 11	None	Ferrug.	.....	0.10	6.6	4.7	.0014	.0060	.0000	.0000	.20	1.1	....	..
3961	Sept. 11	V. slight	V. slight	Veg.	0.10	5.2	2.1	.0008	.0110	.0000	.0000	.05	1.1	....	†
4925	1907 Oct. 6	Mod. slight	Slight	S. earthy	0.40	5.0	2.9	.0020	.0130	.0060	.0000	.88	1.9	....	..
5182	1908 Mar. 23	V. slight	Slight	None	0.05	5.7	2.5	.0024	.0018	.0080	.0000	.11	0.4	....	*

* Colon B. present. † Reservoir.

Ten private supplies were investigated. Of these six were found of good quality, one good but found dissolved lead, two of doubtful character and one unfit for use.

BENTON.—Water is obtained from private springs, through lead pipes and logs, and from wells. The wells are dug from eight to twenty feet deep. There are many springs about the town.

BERLIN.—No public supply. There are two private supplies, owned and operated by one company,—the Berlin water works, built in 1892–'93, and the Cold Water Spring Company, installed in 1898. The source is a stream and springs. For a period of about six weeks each year the latter

supply has to be supplemented by water pumped from Androscoggin River, above the city limits.

Samples representing three supplies of good quality, one of poor character, were received. Two polluted ice samples were also found.

Chemical Examination of Water from Berlin Water Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
843	1902 Oct. 9	None	None	V. slight	0.75	6.50	1.40	.0000	.0112	.0000	.0000	.05	1.4	..	....
1061	1903 Feb. 22	None	None	None	0.0	12.30	6.60	.0000	0000	.0150	.0000	.07	2.0	..	....
1326	July 13	None	None	V. slight	0.65	4.60	1.80	.0000	.0104	.0000	.0000	.05	0.7	..	....
1491	Sept. 3	None	None	V. slight	0.4	3.60	1.40	.0000	.0044	.0000	.0000	.07	1.1	..	....
1828	1904 Feb. 1	Slight	Much fine	V. slight	0.0	9.80	7.20	.0016	.0008	.0000	.0000	.10	5.8	..	†
2179	July 20	None	None	None	0.0	12.40	9.30	.0000	.0000	.0200	.0000	.35	7.4	..	....
2383	Sept.16	None	Slight	None	1.10	8.00	2.60	.0006	.0166	.0700	.0000	.05	1.4	..	‡
2680	1905 Feb. 4	None	None	V. slight	0.25	4.8	2.4	.0000	.0000	.0150	.0000	.05	0.6	..	....
3117	Aug. 25	None	S. floc.	Veg.	.25	4.0	1.8	.0008	.0072	.0050	§	.05	....	..	*a
3118	Aug. 25	None	None	None	0.05	5.4	2.7	.0006	.0026	.0450	.0000	.07	....	..	*b
3389	1906 Jan. 10	None	None	S. veg.	0.20	6.3	3.3	.0008	.0040	.0250	.0000	.07	1.2	..	....
3562	Apr. 20	.....	.....	.....	....	....	....	.....	.....	.....	.....	....	....	..	*c
3565	Apr. 23	V. slight	None	S. veg.	0.05	20.5	14.8	.0086	.0084	.3000	.0005	2.00	5.4	..	*d
3566	Apr. 23	V. slight	V. slight	M. veg.	0.05	8.5	4.0	.0136	.0154	.0100	.0000	0.10	1 6	..	*e
3567	Apr. 23	None	None	Slight	0.20	7.5	3.5	.0020	.0080	.0100	.0000	0.10	1.8	..	*f
3568	Apr. 23	Slight	S. floc.	M. veg.	0.60	7.8	4.2	.0006	.0134	.0100	.0000	.07	1.6	..	....
3571	Apr. 23	None	V. slight	.....	0.40	6.8	4.5	.0034	.0110	.0100	.0000	.05	1.4	..	*g
3573	Apr. 25	None	None	None	0.20	4.7	2.7	.0010	.0070	.0750	.0000	.05	0.6	..	h
3574	Apr. 25	None	V. slight	S. veg.	0.05	4.2	2.0	.0014	.0074	.0100	.0000	.05	0.3	..	i
3659	June 5	None	None	None	0.00	5.1	3.5	.0012	.0014	.0150	.0000	.10	1.4	..	....
3660	June 5	V. slight	None	Slight	0.00	5.6	4.2	.0012	.0028	.0050	.0000	.10	....	..	b
3661	June 5	V. slight	V. slight	S. veg.	0.50	4.6	2.2	.0022	.0064	.0050	.0000	.07	0.6	..	i
3662	June 5	None	None	V. S. vg.	0.30	5.0	2.8	.0008	.0050	.0000	.0050	.05	1.4	..	j

* Colon B. present: *a* Bean and Horn brooks; *b* Cold Spring; *c* represents five samples, taken from St. Giles aqueduct, Green Street aqueduct, Western Avenue aqueduct, Berlin Mills aqueduct, East Side aqueduct, all show Colon B.; *d* Brown and Main streets spring; *e* Damars reservoir; *f* Stahl reservoir; *g* East Side reservoir; *h* Horn Brook; *i* Bean Brook; *j* Green Spring.

† Artesian well of Berlin Water Company.
‡ Stream recently added to system.
§ Slight trace.

Chemical Examination of Water from Berlin Water Company— Concluded.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
	1907														
4318	Jan. 31	None	None	None	0.25	.....	....	.0016	.0054	.0250	.0000	.15	1.1	....	..
4319	Jan. 30	None	None	Veg.	0.25	.....	....	.0026	.0046	.0250	.0000	.12	1.2	....	..
4406	Apr. 5	None	V. slight	S. musty	0.38	4.9	2.8	.0010	.0104	.0250	.0000	.05	2.0	....	..
	1908														
5163	Mar. 9	None	None	None	0.25	3.2	1.3	.0008	.0050	.0250	.0000	.07	1.2	....	..
5234	Apr. 15	V. slight	V. slight	None	0.55	3.7	1.4	.0004	.0054	.0120	.0000	.04	0.4	....	..
5247	Apr. 22	Mod. opal	Heavy earthy	S. earthy	Cloudy	12.0	10.0	.0002	.0010	.0040	.0000	.37	1.5	....	*k*

k **Reservoir of G. O. Holt Supply.**

Chemical Examination of Spring owned by the Burgess Sulphite Fibre Company.

5544	1908 Aug. 26	None	None	None	0.05	9.7	6.3	.0006	.0024	.1000	.0000	1.00	3.2	....	..

Chemical Examination of Filtered River Water of the Burgess Sulphite Fibre Company's Supply.

5545	1908 Aug. 21	None	V. slight	Slight	0.40	4.8	1.9	.0004	.0054	.0020	.0000	.15	1.2	....	..

BETHLEHEM.—The precinct supply, completed in 1898, is from a stream. The water shed is wooded several miles each side. The water is delivered by gravity through about twelve miles of iron service and main pipes. Ninety-eight per cent. of the population take this water.

Chemical Examination of Water Supplied by the Crystal Springs Water Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
347	1902 Jan. 3	Slight	Slight vg. and min.	Earthy veg.	0.2	5.30	3.80	.0074	.0076	.0400	.0000	.06	1.6	....	..
2998	1905 July 19	None	None	Slight	0.05	3.5	2.2	.0000	.0020	.0100	.0000	.05	1.5	....	..
3360	1906 Jan. 3	None	None	None	0.00	3.9	1.7	.0006	.0022	.0300	.0000	.05	1.4	..	..
3883	Aug. 22	None	V. slight	S. foul	0.20	4.0	1.5	.0008	.0024	.0100	.0000	.05	0.4	....	..
4184	Nov. 21	None	None	None	0.20	2.0	1.0	.0010	.0044	.0200	.0000	.15	0.4	....	..
4415	1907 Apr. 8	None	None	S. veg.	0.13	3.4	1.7	.0004	.0044	.0100	.0000	.07	1.6	....	..
4991	Oct. 31	None	None	None	0.30	3.3	1.5	.0010	.0054	.0100	.0000	.08	0.4	....	..
5176	1908 Mar. 18	None	None	None	0.10	2.3	.8	.0002	.0014	.0100	.0000	.08	0.4	....	..

The single private supply brought to our attention proved of doubtful character.

BOSCAWEN.—Water is from the public supply, Penacook & Boscawen Water Precinct, constructed in 1892. The source is a pond of 340 acres; greatest depth, 36 feet; soil, largely gravel. The watershed is nearly seven square miles, both wooded and cleared. There are five or six houses on the shores of the pond. It is a gravity system, through 13 miles of wooden and galvanized iron pipe. About two hundred families are supplied.

Examination of Water from Tap of Penacook & Boscawen Water Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
789	1902 Sept. 9	None	None	S. veg.	0.45	10.10	1.80	.0000	.0142	.0000	.0000	.11	1.5	....	..
1944	1904 May 9	V. slight	Slight	Dec. vg.	0.3	4.20	1.70	.0000	.0032	.0000	.0000	.15	1.6	....	..
2690	1905 Feb. 9	None	None	None	0.25	6.4	2.4	.0000	.0010	.0000	.0000	.10	0.9	....	..
3096	Aug. 18	Consid.	Slight	Earthy	0.30	4.9	1.9	.0000	.0140	.0100	.0000	.17	1.1	....	*
3194	1906 Jan. 13	None	None	S. veg.	0.50	5.0	2.5	.0024	.0084	.0100	.0000	.17	1.1	....	..
3860	Aug. 18	.....	.....	.....	0.40	5.3	2.9	.0028	.0114	.0050	.0000	.07	1.4	....	..
4171	Nov. 20	None	V. slight	Earthy	0.30	5.0	3.0	.0040	.0094	.0300	.0000	.10	1.2	....	..
4440	1907 Apr. 16	Sl. opal	Slight	Woody	0.30	6.5	2.4	.0008	.0086	.0040	.0000	.07	1.2	....	..
4957	Oct. 15	V.S. opal	None	None	0.50	5.5	2.8	.0010	.0108	.0100	.0000	.14	0.4	....	..
5198	1908 Mar. 30	None	V. slight	S. veg.	0.40	2.7	1.7	.0002	.0068	.015	.0000	.20	1.2	....	..

* Colon B. present.

Bow.—Of six samples representing private supplies, four proved good, the two others being condemned because of excessive lead content.

Bradford.—No public supply.

Chemical Examination of Water from Lake Massasecum.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
3749	1906 July 12	V. slight	S. veg.	None	0.2	4.2	1.8	.0028	.0154	.0030	.0000	.07	0.6	....	..

Five private supplies investigated showed two of good quality, two good but for lead, while one was classed as doubtful.

BRENTWOOD.—No public supply.

BRIDGEWATER.—The water supply is from springs and wells, located one on each homestead. One private supply of good quality and one doubtful were found.

BRISTOL.—Bristol Aqueduct Company, incorporated in 1886, supplies water from Newfound Lake, the area of which is about nine square miles. The water shed is largely wooded; some cleared land. It is a gravity system, with about six miles of pipe, mostly cement, but some cast-iron mains, and galvanized iron, lead and tin-lined service pipes. About three fourths of the population of the village use the aqueduct water, while there are a few wells, mostly located back on the hills, away from buildings.

Chemical Examination of Water from a Faucet of the Bristol Aqueduct Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
747	1902 Aug. 26	None	V. slight	S. veg.	0.15	3.90	1.50	.0016	.0050	.0000	.0000	.06	.4	..	..
1321	1903 July 13	V. slight	Slight	Dec. vg.	0.1	3.00	.90	.0028	.0044	.0000	.0000	.075	1.2	....	..
1945	1904 May 5	Slight	None	S. veg.	0.1	4.20	1.80	.0000	.0014	.0000	.0000	.075	1.5	....	*
2664	1905 Jan. 30	None	None	S. veg.	0.15	4.2	2.1	.0000	.0014	.0050	.0000	.10	0.6	...	..
2998	July 18	None	None	Vege'ble	0.10	3.9	1.9	.0000	.0024	.0000	.0000	.12	0.9	....	..
3351	1906 Jan. 2	None	V. slight	S. veg.	0.10	2.5	1.1	.0014	.0066	.0050	.0000	.07	0.7	....	..
3853	Aug. 17	None	V. slight	Vege'ble	0.10	4.1	2.2	.0014	.0070	.0050	.0000	.15	0.4	....	..
4170	Nov. 20	None	None	None	0.10	4.0	2.5	.0010	.0044	.0050	.0000	.07	0.4	....	..
4417	1907 Apr. 9	None	None	None	0.13	2.8	2.4	.0010	.0030	.0050	.0000	.14	0.4	....	*
4909	Oct. 30	None	None	None	0.05	2.4	1.8	.0014	.0048	.0050	.0000	.05	0.9	.015	..
5174	1908 Mar. 16	None	None	S. earthy	0.15	2.9	1.7	.0020	.0030	.0040	.0000	.16	0.4	....	..

* Colon B. present.

Of the five private supplies examined, two were good, three good but for dissolved lead, and one of doubtful character.

BROOKFIELD.—No public supply.

AUBURN.—No public water supply. There is one private supply from which seven families are furnished, and one public watering trough for the town.

Chemical Examination of Water from Well Supplying Auburn.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
3027	1905 July 27	None	None	None	0.00	4.9	3.2	.0014	.0014	.0000	.0000	.25	1.6	....	..
3280	Nov. 1	None	S. ferrug.	S. earthy	0.05	3.0	1.0	.0014	.0024	.0050	.0000	.30	0.9	....	*
3851	1906 Aug. 16	Consid. ferrug.	S. ferrug.	Earthy	0.08	4.1	3.4	.0040	.0028	.0100	.0001	.40	2.3	....	..
4163	Nov. 15	Sl. opal	Slight	M. veg.	0.50	6.0	3.4	.0010	.0134	.0050	.0000	.07	1.2	....	..
4410	1907 Apr. 8	Mod.	Mod. ferrug.	Slight	0.40	2.2	1.5	.0006	.0072	.0050	.0000	.28	1.2	....	..
5173	1908 Mar. 18	None	V. slight	S. earthy	0.20	2.2	.9	.0002	.0026	.0060	.0000	.37	0.4	....	..

* Colon B. present.

Of the two private supplies sampled one proved of good quality, the other unfit for drinking.

BARNSTEAD.—Four private supplies investigated showed one good, one good but for dissolved lead, one of doubtful character and one polluted.

BARRINGTON.—One of two private supplies examined was found to be unfit, the other of good quality.

BARTLETT.—The public water supply, owned by the village precinct, was installed about the year 1888 by the Bartlett Water Company. The source is a stream having a watershed of two square miles, wooded land, no inhabitants.

Chemical Examination of Water from Tap of Bartlett Water Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
	1902														
880	Oct. 21	None	None	V. S. vg.	0.01	4.90	.80	.0000	.0020	.0000	.0000	.07	.6	....	..
	1903														
1339	July 15	None	None	S. veg.	0.15	5.30	1.20	.0000	.0020	.0000	.0000	.10	0.9	....	..
	1904														
1991	May 24	None	None	V. slight	0.05	5.40	1.90	.0000	.0014	.0000	.0000	.05	1.2	....	..
	1905														
2677	Jan. 31	None	None	None	0.00	5.0	2.6	.0000	.0000	.0000	.0000	.10	1.1	....	..
2978	July 11	None	V. slight	None	0.12	4.0	2.0	.0006	.0006	.0000	.0000	.05	0.7	....	..
3286	Nov. 9	None	V. slight	None	0.15	2.7	2.0	.0010	.0048	.0050	.0000	.10	0.3	....	..
	1906														
3852	Aug. 16	None	V. slight	None	0.08	4.0	2.9	.0010	.0080	.0050	.0000	.12	1.0	....	..
4179	Nov. 21	None	None	None	0.10	3.5	1.9	.0008	.0048	.0050	.0000	.05	0.4	....	..
	1907														
4428	Apr. 10	None	None	None	0.12	2.5	1.9	.0008	.0014	.0050	.0000	.05	0.9	....	..
4928	Oct. 7	None	None	None	0.05	2.3	.8	.0010	.0022	.0040	.0000	.10	0.4	....	..
	1908														
5201	Apr. 1	None	V. slight	Earthy	0.05	3.7	1.5	.0002	.0018	.0200	.0000	.11	0.4	....	..
5428	July 20	None	Consid. floc.	Earthy	0.05	3.3	2.5	.0014	.0026	.0100	.0000	.07	0.4	...	*a*
5429	July 20	V. slight	Consid. floc.	S. earthy	0.05	2.8	2.0	.0012	.0008	.0080	.0000	.08	0.4	....	**b*

* B. Coli present.
a South Branch, Albany Brook.
b East Branch, Albany Brook.

BATH.—Water is supplied by two private companies from springs, dug in a clay soil. The water runs by force of gravity, with about two miles of iron main and service pipes. There are 12 or 15 wells within the area supplied.

Chemical Examination of Water from Faucet of Bath Aqueduct Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
802	1902 Sept. 13	None	None	None	0.0	7.30	3.60	.0000	.0014	.0150	.0002	.15	3.6	....	..
2999	1905 July 20	None	Slight	S. earthy	0.05	6.2	4.9	.0000	.0014	.0200	.0000	.15	3.2	....	*
4418	1907 April 9	None	None	Slight	0.00	10.5	7.6	.0008	.0004	.0000	.0000	.25	5.3	....	..
4906	Sept. 30	None	S. earthy	S. earthy	0.05	.....	....	.0002	.0010	.0050	.0000	.26	5.3	....	..
5180	1908 Mar. 20	None	None	None	0.05	6.1	3.5	.0010	.0010	.0300	.0000	.29	3.2	....	..

* Colon B. present.

BEDFORD.—No public supply. Water is obtained wholly from private wells and aqueducts on the farms. The single private supply investigated proved to be polluted.

BELMONT.—The Belmont Water Works, owned by the town, were installed in 1893. Water is obtained from wells, supplemented by a stream in dry seasons. There is a pumping station for use in dry seasons, by which water is pumped from a stream to the reservoir. There is also a private supply in the town. The pipes are of wood mains, and galvanized iron service.

Chemical Examination of Water from Tap of Belmont Water Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
864	1902 Oct. 15	None	None	None	0.0	5.60	3.00	.0000	.0030	.0000	.0000	.12	3.0	..	....
1327	1903 July 13	Slight	Slight	Dec. foul	0.05	5.10	2.60	.0014	.0012	.0300	.0000	.25	1.2	..	*a*
1328	July 13	None	None	V. slight	0.05	4.60	2.00	.0000	.0010	.0300	.0000	.20	1.5	..	...
1329	July 13	None	None	None	0.05	4.30	2.90	.0000	.0000	.0150	.0000	.20	1.2	..	....
1931	1904 May 7	None	None	Slight	0.0	2.50	.90	.0008	.0034	.0000	.0000	.125	.7	..	....
2162	July 18	None	None	None	0.1	3.20	2.10	.0000	0000	.0000	.0000	.075	1.9	..	....
2481	Oct. 25	None	V. S. fine	S. veg.	0.30	4.3	2.3	.0000	.0014	.0000	.0000	.10	1.8	..	....
2482	Oct. 25	None	Con. floc.	V. slight	0.00	3.3	2.0	.0000	.0000	.0000	.0000	.07	1.9	..	....
2518	Nov. 7	None	Con. floc.	Dec. vg.	0.25	4.6	2.7	.0010	.0058	.0000	.0000	.12	1.9	..	*a**
2560	Nov. 28	None	None	None	0.10	4.0	3.2	.0000	.0000	.0000	.0000	.17	0.9	..	....
2657	1905 Jan. 23	None	None	Slight	0.20	4.4	2.7	.0000	.0000	.0100	.0000	.15	0.7	..	....
2986	July 17	None	None	Slight	0.20	4.5	2.7	.0000	.0010	.0100	.0000	.15	0.7	..	*
3279	Nov. 1	None	V. slight	Veg.	0.20	5.1	3.6	.0014	.0058	.0050	.0000	.22	0.7	..	...
3636	1906 May 24	None	V. slight	S. veg.	0.25	4.8	2.6	.0010	.0060	.0100	.0000	.10	....	..	*
3651	May 30	.....	.....	.....	....	.....	....	.....	.....	.....	.....	....	....	..	*
3856	Aug. 17	None	V. slight	None	0.20	5.0	2.7	.0010	.0044	.0050	.0000	.10	1.1	..	....
4158	Nov. 14	V.S. opal	Slight	Veg.	0.15	6.0	3.5	.0014	.0042	.0050	.0000	.05	1.2	..	....
4416	1907 Apr. 8	None	None	Earthy	0.15	2.4	1.5	.0012	.0026	.0100	.0000	.17	0.9	..	....
4907	Sept. 30	None	None	None	0.35	4.3	2.8	.0012	.0104	.0050	.0000	.32	1.2	..	*
5189	1908 Mar. 25	Consid.	M. earthy	Slight	0.40	3.0	1.5	.0002	.0114	.0020	.0000	.12	0.4	..	....

a Stream at pumping station. The quality of this water varies according to the use of the auxiliary stream supply.
* Colon B. present.

One private supply examined was found in good condition.

abundant and is pumped to the supply reservoir. Water from the stream is held in three reservoirs, with a capacity of 32,000,000 gallons.

Besides the public supply there are two private systems of water works in Claremont: one, the Tyler water works, was built in 1870, the source being springs. The springs are all excavated about a reservoir, into which the water runs. There are also springs in the bottom of the reservoir, which is about five acres in area.

The other private system, known as the Grannis Water Works, built about 1892 and owned and operated by Herman Holt, Esq., is also supplied by springs. There are two small reservoirs from which this water is taken: one some 30 feet in diameter, and about three feet deep on an average; the other some 75 feet in diameter and of an average depth of about three feet. (See special report elsewhere.)

Chemical Examination of Water from Town Supply Reservoir.

Number.	Date of collection.	Appearance.			Color.	Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.		Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
797	1902 Sept. 11	None	None	S. veg.	0.15	6.30	2.30	.0000	.0056	.0000	.0000	.12	1.9	...	..
1323	1903 July 13	None	None	S. musty	0.2	4.30	2.20	.0000	.0056	.0000	.0000	1.07	1.9	....	..
1942	1904 May 9	Slight	None	None	0.1	5.60	4.40	.0000	.0030	.0000	.0000	.07	2.6	...	..
2668	1905 Jan. 30	None	None	Pec.	0.15	5.1	3.0	.0000	.0010	.0100	.0000	.12	1.5	....	..
3028	July 28	V. slight	S. fine	Slight	0.15	4.9	3.1	.0014	.0050	.0100	.0000	.10	1.9	....	..
3873	1906 Aug. 21	None	V. slight	Veg'ble	0.30	5.5	4.0	.0006	.0060	.0000	.0000	.05	1.2	....	..
4082	Oct. 22	None	Sl. floc.	Earthy	0.05	4.7	3.3	.0018	.0070	.0050	.0001	.40	2.3	....	..
4496	1907 May 2	None	Slight	M. veg.	0.20	2.8	2.1	.0010	.0048	.0050	.0000	.19	0.9	....	..
4935	Oct. 8	Slight	V. slight	None	0.30	5.5	3.4	.0036	.0074	.0070	.0000	.20	2.3	...	..
5205	1908 April 3	Slight	V. slight	S. earthy	0.25	4.8?	1.5	.0008	.0036	.0080	.0000	.21	1.2	....	..
5444	July 20	Marked	Consid. gel.	None	.00	4.6	2.9	.0020	.0028	.0040	.0000	.09	1.2	....	..
5482	Aug. 6	Sl. opal	Mod. gel.	None	0.60	4.8	3.2	.0032	.0054	.0070	.0000	.13	1.8	....	*
5506	Aug. 13	V. slight	V. slight	Foreign	0.15	5.5	2.5	.0014	.0090	.0000	.0000	.04	1.5	....	*
5507	Aug. 13	Slight	M. floc.	None	0.30	5.5	3.0	.0008	.0004	.0050	.0000	.14	1.1	....	..
5571	Aug. 28	V. slight	Sl. fine.	Sl. foul	0.15	5.3	2.3	.0004	.0060	.0030	.0000	.12	1.9	....	*

* B. Coli present.

Chemical Examination of Water from Tyler Aqueduct.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
895	1902 Oct. 29	None	None	None	0.0	8.70	5.30	.0000	.0022	.0150	.0000	.09	3.1	V. S.	..
3378	1906 Jan. 7	None	None	None	0.00	8.8	5.8	.0008	.0016	.0200	.0000	.15	3.9	trace	..
3975	Sept. 13	None	None	None	0.05	11.1	8.0	.0010	.0074	.0100	.0000	.05	3.2	0.015	..
4476	1907 Apr. 29	None	None	V. slight	0.00	5.6	4.0	.0010	.0014	.0500	.0000	.14	2.6	.....	..
4934	Oct. 8	V. slight	V. slight	None	0.00	6.2	4.2	.0004	.0050	.0050	.0000	.15	3.2	.....	..
5573	1908 Aug. 28	None	Mod. earthy	None	0.05	5.3	3.8	.0002	.0002	.0020	.0000	.12	2.8	High	..

Chemical Examination of Water from Faucet of Hotel, Supplied by Grannis Water Works.

Number.	Date of collection.	Appearance.				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
236	1901 Oct. 28	None	None	None	0.0	7.10	4.40	.0028	.0044	.0200	.0003	.07	....	.....	..
237	Oct. 28	None	None	None	0.0	9.20	5.30	.0028	.0054	.0200	.0003	.07	....	.....	..
241	Oct. 31	None	None	None	0.0	7.80	5.70	.0010	.0040	.0200	.0004	.07	2.4	.....	..
3042	1905 Aug. 1	Consid. earthy	Slight	Earthy	0.30	8.2	6.6	.0000	.0026	.0100	.0000	.07	3.9	S. trace	..
3364	1906 Jan. 4	None	None	None	0.00	7.5	5.2	.0010	.0010	.0100	.0000	.10	5.0	.0150	..

Chemical Examination of Water Supply of Camp Ground Association, Claremont Junction.

5159	1908 Mar. 5	V. slight	S. earthy	Earthy	0.10	.....	....	.0100	.0096	.0100	.0000	.68	4.6	.....	*c*
5160	Mar. 5	None	None	None	0.00	.....	....	.0004	.0024	.0120	.0000	.40	1.2	.....	*d*
5161	Mar. 5	None	None	None	0.05	.....	....	.0036	.0024	.0080	.0000	.19	8.9	.....	*e*

c Brook; *d* Pump in ravine; *e* Spring under pumphouse.

Chemical Examination of some Claremont Spring Supplies.

Number.	Date of collection.	Appearance.				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
5561	1908 Aug. 28	None	None	Sl. foul	0.05	8.2	5.1	.0014	.0002	.0020	.0000	.17	3.6	.....	*a*
5562	Aug. 28	None	None	None	0.00	20.9	17.1	.0008	.0002	.0050	.0000	.21	6.6	High	*b*
5563	Aug. 28	None	Slight	None	0.00	9.4	7.0	.0002	.0002	.0100	.0000	.12	6.0	.....	*c*
5564	Aug. 28	None	None	None	0.00	9.8	6.7	.0006	.0024	.0300	.0001	1.28	4.2	.....	**d*
3685	1906 June 18	None	None	None	0.05	17.0	9.0	.0014	.0014	.4000	.0001	1.22	....	.....	*
4057	Oct. 9	V. slight	V. slight	Slight	0.05	....	....	.0006	.0022	.5000	.0000	1.35	6.0	.....	*
5565	1908 Aug. 28	None	Slight	None	0.00	7.0	4.7	.0004	.0004	.0200	.0000	.40	4.2	.....	*e*
5566	Aug. 28	None	None	None	0.00	16.1	6.8	.0002	.0002	.1000	.0000	1.64	6.9	.....	*f*
5567	Aug. 28	None	V. slight	Sl. foul	0.05	16.1	10.3	.0006	.0002	.1200	.0000	1.60	7.6	.....	**g*
5568	Aug. 28	None	S. earthy	V. slight	0.05	9.5	5.8	.0004	.0002	.0020	.0000	.31	3.2	.....	*h*
5569	Aug. 28	None	S. earthy	None	0.00	6.3	3.9	.0002	.0006	.0040	Ft.tr.	.22	2.6	.....	*i*
5570	Aug. 28	V. slight	Slight	None	0.05	8.3	5.1	.0008	.0002	.0100	.0000	.27	3.0	.....	*j*
5571	Aug. 28	V. slight	S. earthy	None	0.00	45.3	33.3	.0010	.0004	.5000	.0000	3.50	9.6	.....	*k*

* B. Coli present.
a Brook Spring; *b* Severance Spring; *c* Ellis Spring; *d* New Foundry Spring; *e* Rossiter Shop Spring, owned by Maynard Shoe Co.; *f* Spring near Healey's blacksmith shop; *g* Pine Woods Spring; *h* Spring supplying stone watering trough; *i* Hoban Spring; *j* Spring supplying Roberts' mill; *k* Button Shop Spring.

Of four other supplies examined one was found of good quality, one poor and two unfit for use.

CLARKSVILLE.—The water supply of the town is from private wells and springs, and is brought to the dwellings in logs, and pipes in some instances.

COLEBROOK.—This town does not own a public water supply. There are two private systems, the J. E. Lombard Water Works, supplying about forty families with water from springs, and the Colebrook Water Co., which constitutes the principal supply. The source of the latter is a stream and springs, and the water flows about four miles through iron pipes, both main and service. Three fourths of the watershed is cleared, and one fourth wooded. There are many private wells within the radius reached by these supplies.

Chemical Examination of Water from Colebrook Water Co.'s Supply.

Number.	Date of collection.	Appearance: Turbidity.	Appearance: Sediment.	Appearance: Odor.	Color.	Residue on Evapo'n: Total.	Residue on Evapo'n: Fixed.	Ammonia: Free.	Ammonia: Albuminoid.	Nitrogen as: Nitrates.	Nitrogen as: Nitrites.	Chlorine.	Hardness.	Lead.	
2378	1904 Sept. 15	Marked	Slight	None	0.4	10.40	3.90	.0000	.0044	.0050	.0000	.050	5.5	..	.. .
2379	Sept. 15	None	V. much floc. veg.	None	1.1	11.00	2.80	.0000	.0001	.0000	.0001	.05	4.4	..	....
2380	Sept. 15	None	None	None	0.0	10.00	5.20	.0000	.0000	.0300	.0000	.07	2.7	..	....
2381	Sept. 15	None	V. much floc. veg.	None	0.5	11.70	5.00	.0000	.0072	.0000	.0000	.05	4.8	..	....
2636	1905 Jan. 9	None	V. much	Vege'ble	0.05	8.7	5.9	.0000	.0020	.0150	.0006	.07	2.7	..	*
3089	Aug. 15	None	None	None	0.28	10.3	6.8	.0006	.0038	.0150	.0000	.05	5.5	..	....
3363	1906 Jan. 3	None	None	S. veg.	0.15	9.3	6.7	.0006	.0014	.0300	.0000	.05	4.9	..	....
3866	Aug. 18	None	None	None	0.40	9.3	7.3	.0014	.0080	.0000	.0000	.12	4.5	..	*
4430	1907 Apr. 10	None	None	Slight	0.33	6.7	4.2	.0016	.0044	.0200	.0000	.07	3.2	..	....
4945	Oct. 11	None	V. slight	None	0.70	6.0	3.3	.0014	.0084	.0040	.0000	.19	3.2	..	....
5210	1908 Apr. 3	None	None	None	0.10	7.0	5.6	.0014	.0030	.0080	.0000	.05	3.2	..	...

Chemical Examination of Water from the J. E. Lombard Supply.

3057	1905 Aug. 6	None	S. ferrug.	S. earthy	0.05	10.80	5.6	.0006	.0010	.0300	.0000	.05	3.9	..	...
3367	1906 Jan. 4	None	None	None	0.05	5.3	3.0	.0006	.0018	.0230	.0000	.05	2.6	..	....
3869	Aug. 20	None	Slight	None	0.05	5.0	3.3	.0008	.0010	.0050	.0000	.05	...	..	....

* B. Coli present.

COLUMBIA.—There is no village of any considerable size in this town. Nearly every house is supplied from springs with "water, mostly 'soft water,' pure, fresh, and cold." Very few wells in town.

CONCORD.—The Concord Water Works, owned and operated by the city, were installed in 1871–'72; extended to Penacook and St. Paul's School in 1882; high service extension in 1891; high service extended to Penacook in 1904. The source of the supply is Penacook Lake, with an area at high water of 337 acres; greatest area of good depth running from 10 to 75 feet; very little shallow water; bottom gravelly. The watershed, about $3\frac{1}{8}$ square miles, is partly wooded and partly cleared. Outside of cottagers, a canvass showed 17 inhabitants to the square mile. The

shores, excepting Penacook Park, which is well policed, are now rarely frequented by picnic parties. A few cottages, occupied during the summer, have been built on the shores, but they are under the sanitary supervision of the city health officer. The State Board of Health has also established rules and regulations for the protection of the purity of this body of water. The city owns and controls four fifths of the shore.

Chemical Examination of Water from City Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
1	1901 May 22	V. slight	Slight	Dec. vg.	0.0	2.90	1.80	.0015	.0163	.0048	.0000	.13	....	.....	...
2	May 22	V. slight	Slight	Faint vg.	0.0	....	....	.0013	.0122	.0048	.0000	.12	....	.....	...
3	May 22	Slight	Consid.	Dec. vg.	0.0	....	....	.0013	.0149	.0048	.0000	.12	...	.....	...
4	May 23	Slight	Consid.	Dec. vg.	0.0	2.50	1.20	.0014	.0137	.0050	.0000	.12	....	.....	...
107	Aug. 6	None	None	Dec. vg.	0.12	3.30	1.90	.0000	.0154	.0000	.0000	.11	....	...	...
113	Aug. 12	Slight	Slight floc.	Dec. vg.	0.1	4.00	1.40	.0014	.0156	.0000	.0000	.10	....	.....	...
357	1902 Jan. 11	None	None	Veg.	0.1	3.20	1.20	.0030	.0138	.0000	.0000	.14	1.1	.....	...
398	Feb. 10	V. slight	V. slight	Veg.	0.12	3.70	1.90	.0044	.0136	.0000	.0000	.12	.9	.....	...
591	June 13	V. slight	V. slight	Dec. vg.	0.15	5.30	1.50	.0016	.0146	.0000	.0000	.11	.7	.....	...
592	June 13	V. slight	Slight	Dec. vg.	0.1	6.20	1.60	.0000	.0124	.0000	.0000	.11	.7	.....	...
593	June 13	V. slight	V. slight	Slight	0.15	5.50	2.10	.0006	.0072	.0000	.0000	.11	.7	.....	...
594	June 13	V. slight	V. slight	Veg.	0.15	6.10	1.70	.0006	.0126	.0000	.0000	.11	.7	.....	...
595	June 13	V. slight	V. slight	Veg.	0.15	6.70	1.70	.0006	.0108	.0000	.0000	.12	.7	.....	...
596	June 13	None	None	Veg.	0.15	6.20	1.60	.0000	.0112	.0000	.0000	.11	.7	.....	...
775	Sept. 4	None	None	Dec. vg.	0.1	4.30	1.50	.0000	.0102	.0000	.0000	.12	1.5	.....	...
13	Nov. 11	None	None	Sl. veg.	0.05	5.80	1.60	.0000	.0094	.0000	.0000	.14	1.5	.....	...
966	1903 Jan. 1	None	None	Sl. veg.	0.12	5.40	1.60	.0000	.0086	.0000	.0000	.17	1.5	....	...
983	Jan. 12	None	None	Sl. veg.	0.05	.....	....	.....	.....	.0000	.0000	....	....	*	...
1078	Mar. 7	None	None	V. slight	0.05	.....	....	.0006	.0056	.0050	.0000	.15	1.8	....	...
1153	Apr. 21	Slight	Fine	Dec. vg.	0.05	2.90	1.40	.0000	.0030	.0000	.0000	.15	1.4	.....	...
1269	June 19	None	None	Sl. veg.	0.05	.....	....	.....	.....	.....	.....	....	...	.027	...
1924	1904 May 6	Slight	Slight	Sl. veg.	0.05	3.10	1.60	.0006	.0054	.0000	.0000	.15	1.5	.....	...
2371	Sept. 15	None	None	Sl. veg.	0.05	3.80	0.90	.0000	.0044	.0000	.0000	.13	1.5	.....	†
2584	Dec. 13	V. slight	Slight	Slight	0.05	2.3	1.3	.0000	.0114	.0000	.0000	.15	0.4	.....	†

* Lead present in traces only. † B. Coli present.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
3025	1905 July 27	None	V. slight	S. earthy	0.20	3.7	1.5	.0020	.0134	.0050	.0000	.12	0.9	.....	...
3413	1906 Jan. 25	None	None	Sl. veg.	0.05	4.3	2.3	.0014	.0074	.0050	.0000	.15	0.6	....	...
3457	Feb. 14	.....	.....	.....	....	....	...	.....	.....	.....	.....	....	....	0.000	...
3918	Aug. 31	None	V. slight	S. musty	0.05	3.0	1.5	.0006	.0084	.1000	.0000	.12	0.4	.....	...
3999	Sept. 19	S. opal	V. slight	Slight	0.10	3.2	1.2	.0020	.0100	.0050	.0000	.15	0.4	.....	...
4113	Oct. 29	.....	.....	.....	0.10	.....	....	.0028	.0088	.0050	.0000	.15	0.4	....	a
4413	1907 Apr. 8	None	V. slight	Sl. veg.	0.10	2.8	0.7	.0012	.0062	.0000	.0000	.14	0.9	.....	...
4718	July 16	None	V. slight	Earthy	0.05	3.6	1.1	.0014	.0090	.0050	.0000	.16	0.4	... .	†
4762	July 25	None	None	Earthy	0.05	.....	....	.0010	.0048	.0050	.0000	.20	1 2	.....	...
5221	1908 Apr. 10	V. slight	Slight	Swampy	0.10	3.0	1.5	.0002	.0058	.0030	.0000	.15	0.4	.....	...
5346	June 12	V. slight	Slight floc.	Veg.	0.10	.....	....	.0006	.0044	.0030	.0000	.10	1.2	.....	...

a Dead end of line. * Lead present in traces only. † B. Coli present.

Chemical Analysis of Merrimack River at Concord.

1958	1904 May 16	Slight	Much floc.	Sl. veg.	0.35	8.00	1.70	.0000	.0066	.0050	.0000	.15	1.2	....	..

Chemical Examination of Water from Well in Penacook Park.

3906	1906 Aug. 27	None	V. slight	Sl. veg.	0.10	8.2	4.6	.0010	.0016	.0050	.0000	.35	....	....	*
3992	Sept. 17	....	.....	.....	....	.....	....	.....	.....	.....	.....	....	....	....	*
4619	1907 June 15	None	None	Woody	0.05	.....	....	.0008	.0002	.0050	.0000	.31	2.5	....	..
4666	June 26	None	None	Slight	0.00	.....	....	.0002	.0002	.0050	.0000	.25	2.4	....	..

* Colon B. present.

Chemical Examination of Water from Contoocook River Supplying Drinking Fountain at Contoocook River Park.

5399	1908 July 2	None	None	None	0.20	. ...	....	.0004	.0086	.0080	.0000	.08	0.4	....	*
5407	July 9	None	V. slight	S. earthy	0.35	3.8	2.8	.0030	.0066	.0050	.0000	.08	0.4	....	..
5413	July 12	.....	.....	.....	....	.....	....	.....	.....	.....	.....	....	....	....	†
5425	July 15	.....	. .....	.....	...	.....	....	.....	.....	.....	. ....	....	....	....	†

* Colon B. present. † Colon B. absent.

Chemical Examination of Water from Well in White's Park.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
3917	1906 Aug. 31	None	None	None	0.35	11.5	7.0	.0010	.0020	.2000	.0000	.97	....	.....	...

Chemical Examination of Water from New Hampshire State Hospital.

3680	1906 June 19	None	None	Slight	0.00	17.1	12.1	.0050	.0022	.2000	.0001	1.65	5.1	. ...	...
3911	Aug. 27	.....	.....	.....	....	.....	....	.....	.....	.....	.....	...	....	.....	*a
3912	Aug. 27	.....	.....	.....	....	.....	....	.....	.....	.....	.....	....	....	.....	*b

* B. Coli present.
a Spring; *b* pond.

The Merrimack River does not constitute any part of the water supply for the City of Concord. The latter is taken wholly from Penacook Lake.

Fifty-five samples representing private supplies were received, 24 being found good, 11 good but for contained lead, 14 of doubtful character and six polluted.

Conway.—No public supply. The Conway Aqueduct Company, under local management, supplies the village with water from a system of natural springs about 2½ miles from its center. The village of North Conway has a supply furnished by the North Conway Water & Improvement Co.

Chemical Examination of Water from Faucet of Conway Aqueduct Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
2396	1904 Oct. 2	None	Slight	Sl. veg.	0.25	2.6	2.2	.0000	.0000	.0000	.0001	.07	0.9	.....	...
2402	Oct. 2	None	Slight	None	0.20	6.8	3.4	.0000	.0000	.0000	.0000	.05	1.8	... ..	...
3050	1905 Aug. 4	None	None	S. earthy	0.10	2.6	1.1	.0000	.0024	.0050	.0000	.07	0.6	.....	...
3405	Jan. 21	None	None	None	0.10	4.4	1.2	.0010	.0014	.0100	.0000	.12	0.3	.....	...
4579	1907 May 29	None	None	None	0.10	2.3	1.3	.0006	.0018	.0750	.0000	.11	0.4	.....	...
4938	Oct. 9	None	None	None	0.80	3.2	2.0	.0008	.0068	.0030	.0000	.14	1.2	None	...
5226	1908 Apr. 13	V. slight	V. slight	None	0.20	2.3	1.5	.0000	.0010	.0030	.0000	.05	0.4	None	...

Chemical Examination of Water Supplying North Conway.

3159	1905 Sept. 12	None	None	Slight	0.10	2.7	0.8	.0008	.0042	.0100	.0000	.07	0.3	.....	...
3206	Sept. 29	None	None	Veg.	0.15	4.5	2.5	.0020	.0030	.0100	.0000	.05	0.6	.....	*b*
3207	Sept. 29	None	None	Earthy	0.10	3.3	2.0	.0020	.0024	.0100	.0000	.05	0.1	.....	**c*
3508	1906 Mar. 5	None	None	Veg.	0.05	2.4	1.0	.0008	.0034	.0100	.0000	.05	0.4	.....	...
3714	June 28	None	None	None	0.10	2.5	1.0	.0026	.0020	.0050	.0000	.05	0.3	.....	**c*
3715	June 28	None	V. slight	None	0.10	3.0	1.0	.0014	.0020	.0030	.0000	.05	0.3	.....	**d*
3716	June 28	Slight	Consid. floc.	Veg.	0.40	8.3	1.7	.0192	.0800	.0000	.0000	.10	...	.....	**e*
3750	July 14	.....	.....	.....	....	.....	....	.....	.....	....	....	....	...	.....	*n e*

b Reservoir No. 1; *c* reservoir No. 2; * B. Coli present; *d* reservoir No. 3; *e* Shingle Pond; *n* no B. Coli.

Of the nine private supplies investigated, seven were found of good quality, two polluted.

CORNISH.—No public water supply. All the families of this town depend upon wells, or water taken from springs through lead pipe, each family having a separate supply. The single private supply examined was classed as doubtful.

CROYDON.—One private supply is from a spring, the water being brought one half mile through lead pipe, from which eight families are furnished. Most of the water is from private wells. Five private supplies examined, three proving good, one poor and one unfit for use.

DALTON.—No public supply. Water is obtained from individual springs.

Chemical Examination of Water from Forest Lake.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
4657	1907 June 21	None	None	Slight	0.20	.....	....	.0046	.0130	.0050	.0000	.17	0.6	....	..

DANBURY.—No public or private system of water works. The three private supplies examined were found to represent good water.

DANVILLE.—No public supply. The water supply of Danville is, in nearly every case, from a well near the house or underneath it. One private supply examined was found to be polluted.

DEERFIELD.—No public supply. One private supply examined was found of good quality.

DEERING.—No public water supply. One private supply was found to be polluted by lead.

DERRY.—In 1890 Boston contractors built the Derry Water Works, consisting of about 40 wells driven to a depth of 50 feet. The water is pumped to a standpipe of 180,000 gallons' capacity.

Chemical Examination of Water from Faucet of Derry Water Works Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
794	1902 Sept. 4	None	Slight	V. slight	0.0	6.40	4.80	.0000	.0012	.0120	.0000	.60	3.1	....	..
1372	1903 July 24	None	None	S. musty	0.0	7.00	3.60	.0000	.0010	.1500	.0000	.65	2.3	...	..
1532	Sept. 2	None	V. slight	None	0.1	12.40	6.80	.0000	.0088	.0700	.0000	.55	2.4	...	..
1946	1904 Mar. 10	None	None	S. veg.	0.05	6.90	4.90	.0000	.0014	.1500	.0000	.65	2.6	....	..
2676	1905 Feb. 1	None	None	None	0.00	8.7	6.5	.0000	.0000	.1000	.0000	.72	2.6	....	..
3068	Aug. 9	None	None	Slight	0.00	8.0	4.7	.0000	.0008	.0850	.0000	.62	2.7	....	..
3362	1906 Jan. 4	None	None	None	0.05	7.5	4.8	.0006	.0024	.1000	.0000	.25	2.9	....	..
3855	Aug. 17	None	V. slight	S. earthy	0.20	7.0	4.0	.0006	.0064	.0050	.0000	.55	2.2	....	..
4205	Dec. 5	None	None	None	0.05	7.4	4.3	.0006	.0030	.1000	.0000	.75	2.6	....	..
4206	Dec. 5	V. slight	V. slight	S. veg.	0.30	6.2	3.2	.0046	.0214	.0050	.0000	.30	2.2	....	*
4207	Dec. 5	None	None	Earthy	0.03	7.4	4.2	.0010	.0030	.1400	.0000	.67	2.3	....	*
4429	1907 Apr. 11	None	V. slight	None	0.10	8.8	5.9	.0016	.0010	.2500	.0000	.85	2.6	....	..
4831	Aug. 26	.....	.....	.....	0 20	.....	....	.0014	.0064	.0050	.0000	.51	1.9	....	..
4933	Oct. 7	V. slight	V. slight	None	0.30	6.5	3.8	.0002	.0074	.0150	.0000	.38	2.6	....	*
5171	1008 Mar. 16	None	None	None	0.15	7.3	4.6	.0010	.0012	.0200	.0000	.40	3.2	....	..
5196	Mar. 30	None	None	None	0.00	.....	....	.0004	.0010	.0350	.0000	.86	2.6	....	..
5219	Apr. 8	None	None	None	0.00	4.7	3.1	High	.0028	.0150	.0000	.72	3.2	....	..

* B. Coli present.

One private supply of good quality was reported upon.

DORCHESTER.—No public supply. The single private supply sample received was reported as of doubtful character.

DOVER.—A public water supply was installed by the City of Dover in 1888. The area of the pond from which the supply is taken is, when full, 78¾ acres; when drawn down six feet deep, 69½ acres. There are no

abundant and is pumped to the supply reservoir. Water from the stream is held in three reservoirs, with a capacity of 32,000,000 gallons.

Besides the public supply there are two private systems of water works in Claremont: one, the Tyler water works, was built in 1870, the source being springs. The springs are all excavated about a reservoir, into which the water runs. There are also springs in the bottom of the reservoir, which is about five acres in area.

The other private system, known as the Grannis Water Works, built about 1892 and owned and operated by Herman Holt, Esq., is also supplied by springs. There are two small reservoirs from which this water is taken: one some 30 feet in diameter, and about three feet deep on an average; the other some 75 feet in diameter and of an average depth of about three feet. (See special report elsewhere.)

Chemical Examination of Water from Town Supply Reservoir.

Number.	Date of collection.	Appearance.				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
797	1902 Sept. 11	None	None	S. veg.	0.15	6.30	2.30	.0000	.0056	.0000	.0000	.12	1.9	...	..
1323	1903 July 13	None	None	S. musty	0.2	4.30	2.20	.0000	.0056	.0000	.0000	1.07	1.9	....	..
1942	1904 May 9	Slight	None	None	0.1	5.60	4.40	.0000	.0030	.0000	.0000	.07	2.6	...	..
2668	1905 Jan. 30	None	None	Pec.	0.15	5.1	3.0	.0000	.0010	.0100	.0000	.12	1.5	....	..
3028	July 28	V. slight	S. fine	Slight	0.15	4.9	3.1	.0014	.0050	.0100	.0000	.10	1.9	....	..
3873	1906 Aug. 21	None	V. slight	Veg'ble	0.30	5.5	4.0	.0006	.0060	.0000	.0000	.05	1.2	....	..
4082	Oct. 22	None	Sl. floc.	Earthy	0.05	4.7	3.3	.0018	.0070	.0050	.0001	.40	2.3	....	..
4496	1907 May 2	None	Slight	M. veg.	0.20	2.8	2.1	.0010	.0048	.0050	.0000	.19	0.9	....	..
4935	Oct. 8	Slight	V. slight	None	0.30	5.5	3.4	.0036	.0074	.0070	.0000	.20	2.3	...	..
5205	1908 April 3	Slight	V. slight	S. earthy	0.25	4.8?	1.5	.0008	.0036	.0080	.0000	.21	1.2	....	..
5444	July 20	Marked	Consid. gel.	None	.00	4.6	2.9	.0020	.0028	.0040	.0000	.09	1.2	....	..
5482	Aug. 6	Sl. opal	Mod. gel.	None	0.60	4.8	3.2	.0032	.0054	.0070	.0000	.13	1.8	....	*
5506	Aug. 13	V. slight	V. slight	Foreign	0.15	5.5	2.5	.0014	.0090	.0000	.0000	.04	1.5	....	*
5507	Aug. 13	Slight	M. floc.	None	0.30	5.5	3.0	.0008	.0004	.0050	.0000	.14	1.1	....	..
5571	Aug. 28	V. slight	Sl. fine.	Sl. foul	0.15	5.3	2.3	.0004	.0060	.0030	.0000	.12	1.9	....	*

* B. Coli present.

Chemical Examination of Water from Tyler Aqueduct.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
895	1902 Oct. 29	None	None	None	0.0	8.70	5.30	.0000	.0022	.0150	.0000	.09	3.1	V. S.	..
3378	1906 Jan. 7	None	None	None	0.00	8.8	5.8	.0008	.0016	.0200	.0000	.15	3.9	trace	..
3975	Sept. 13	None	None	None	0.05	11.1	8.0	.0010	.0074	.0100	.0000	.05	3.2	0.015	..
4476	1907 Apr. 29	None	None	V. slight	0.00	5.6	4.0	.0010	.0014	.0500	.0000	.14	2.6	.....	..
4934	Oct. 8	V. slight	V. slight	None	0.00	6.2	4.2	.0004	.0050	.0050	.0000	.15	3.2	.....	..
5578	1908 Aug. 28	None	Mod. earthy	None	0.05	5.3	3.8	.0002	.0002	.0020	.0000	.12	2.8	High	..

Chemical Examination of Water from Faucet of Hotel, Supplied by Grannis Water Works.

Number.	Date of collection.	Appearance.				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
236	1901 Oct. 28	None	None	None	0.0	7.10	4.40	.0028	.0044	.0200	.0003	.07	....	.....	..
237	Oct. 28	None	None	None	0.0	9.20	5.30	.0028	.0054	.0200	.0003	.07	....	.....	..
241	Oct. 31	None	None	None	0.0	7.80	5.70	.0010	.0040	.0200	.0004	.07	2.4	.....	..
3042	1905 Aug. 1	Consid. earthy	Slight	Earthy	0.30	8.2	6.6	.0000	.0026	.0100	.0000	.07	3.9	S. trace	..
3364	1906 Jan. 4	None	None	None	0.00	7.5	5.2	.0010	.0010	.0100	.0000	.10	5.0	.0150	..

Chemical Examination of Water Supply of Camp Ground Association, Claremont Junction.

5159	1908 Mar. 5	V. slight	S. earthy	Earthy	0.10	.....	....	.0100	.0096	.0100	.0000	.68	4.6	.....	*c*
5160	Mar. 5	None	None	None	0.00	.....	....	.0004	.0024	.0120	.0000	.40	1.2	.....	*d*
5161	Mar. 5	None	None	None	0.05	.....	....	.0036	.0024	.0080	.0000	.19	8.9	.....	*e*

c Brook; *d* Pump in ravine; *e* Spring under pumphouse.

Chemical Examination of Water from Taps in the City.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Iron.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
3558	1906 Apr. 13	None	Ferrug.	None	0.20	10.6	8.2	.0014	.0144	.0200	.0000	.70	3.7	....	..
3654	June 5	Opal	Slight	None	0.10	12.6	9.0	.0014	.0140	.0050	trace	.60	3.6	....	..
3655	June 5	Opal	Much fer.	Sl. veg.	0.13	11.0	8.5	.0012	.0040	.0050	trace	.60	3.2	....	..
3701	June 21	Mod'ate	Con. fer.	V. slight	.03	12.8	9.3	.0094	.0024	.0050	.0002	.75	5.7	.66	..
4298	1907 Jan. 28	Mod. opal	Mod. fer.	Sl. veg.	0.30	.....	....	.0030	.0036	.0050	.0000	.42	2.3	.40	*
4311	Jan. 29	Mod. opal	V. slight	Sl. veg.	0.15	.....	....	.0044	.0016	.0080	.0000	.37	2.4	.15	..
4312	Jan. 29	None	None	None	0.00	.....	....	.0038	.0014	.0050	.0000	.40	1.9	.04	..
4318	Jan. 29	Sl. opal	V. slight	Sl. veg.	0.10	.....	....	.0044	.0016	.0080	.0000	.45	2.9	.10	..
4323	Feb. 1	V. slight	V. slight	Veg.	0.10	.....	....	.0040	.0040	.0030	Ft.tr.	.37	1.6	.035	..
4324	Feb. 1	Slight	V. slight	Sl. veg.	0.10	.....	....	.0064	.0048	.0030	Ft.tr.	.38	1.9	.15	..
4325	Feb. 1	Slight	V. slight	Sl. veg.	0.10	.....	....	.0060	.0042	.0030	Ft.tr.	.39	1.9	.13	..
4326	Feb. 1	Slight	V. slight	Sl. veg.	0.10	.....	....	.0079	.0054	.0070	trace	.39	1.6	.15	..
4330	Feb. 6	Slight	Sl. floc.	Slight	0.05	.....	....	.0050	.0016	.0200	.0000	.45	2.2	.17	..
4331	Feb. 6	Mod'ate	Sl. fer.	Slight	0.15	.....	....	.0050	.0026	.0080	.0000	.40	2.2	.09	..
4364	Mar. 7	V.sl.opal	V. slight	V. slight	0.20	5.2	....	.0060	.0070	.0080	trace	.45	1.9	.12	..

Chemical Examination of Water from Kelley Springs.

3754	1906 July 16	None	None	None	0.10	3.5	1.8	.0008	.0048	.0050	.0000	.20	.1	....	..
3836	Aug. 13	None	None	None	0.05	2.8	2.3	.0010	.0060	.0100	.0000	.22	.4	....	..
5326	1908 May 28	Mod'ate	Con. fer.	None	Cloudy	7.7	3.5	.0006	.0150	.0060	.0000	.46	.4	1.25	*a*

*** B. Coli present.**

***a* When sampled the main was undergoing repairs.**

Chemical Examination of Water from the Hussey Well, Springs Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitronen as		Chlorine.	Hardness.	Iron.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
3941	1906 Sept. 6	None	Mod. earthy	None	0.05	5.7	3.0	.....	.....	.0200	.0000	.50	1.4	.....	...
4275	1907 Jan. 9	Sl. opal	V. slight	S. veg.	0.05	.....	.....	.0082	.0012	.0050	.0000	.46	1.5	.048	...
4360	Mar. 6	V.S. opal	V. slight	None	0.20	...	.....	.0010	.0084	.0050	.0000	.65	4.6	.70	...
4384	Mar. 27	Consid. opal	Mod. fine	S. earthy	0.12	5.2	3.9	.0030	.0040	.0200	.0000	.43	1.2	.20	...
4690	July 9	Sl. opal	S. ferrug.	S. earthy	0.10	4.8	3.0	.0010	.0028	.0050	Very high	.40	1.9	.125	*
4734	July 19	None	S. mod.	None	0.05	5.8	4.3	.0018	.0002	.0100	.0000	.66	2.2	.06	...
4791	Aug. 6	V.S. opal	S. ferrug.	None	0.10	5.2	4.4	.0024	.0014	.0050	.0000	.48	1.2	.125	*
4886	Sept. 17	None	V. slight	None	0.05	5.5	4.5	.0010	.0014	.0050	.0000	.48	1.9	.016	...
5325	1908 May 28	None	V. slight	None	0.10	8.8	5.2	.0018	.0002	.0020	.0000	.42	2.6	.20	...

Chemical Examination of Water from Receiving Well, Springs Supply.

3699	1906 June 21	Sl. opal	S. ferrug.	None	0.03	11.0	8.0	.0052	.0026	.0100	.0000	.90	3.6	1.44	...
4136	Nov. 7	Marked ferrug.	Marked ferrug.	None	0.10	10.5	8.0	.0050	.0040	.0080	.0000	.77	3.7	.....	...
4386	1907 Mar. 27	Sl. opal	Sl. fine	S. for'gn	0.05	4.8	3.7	.0030	.0126	.0150	Tr.	.55	1.6	.06	*
4790	Aug. 6	V.S. opal	V. slight	None	0.05	7.8	5.5	.0028	.0010	.0050	.0000	.80	1.2	.055	...
4887	Sept. 17	None	V. slight	None	0.10	5.2	4.3	.....	.....	.....	.....	....	....	....	...
5266	1908 Apr. 29	None	V. slight	V. slight	0.08	6.9	4.8	.0030	.0024	.015	.0000	.52	2.4	.04	...

*** B. Coli present.**

Chemical Examination of Water from No. 8 Catch Basin, Springs Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Iron.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
4359	1907 Mar. 6	Slight	S. ferrug.	None	0.50	.....	....	.0018	.0090	.0050	.0000	1.00	8.1	1.40	...
4422	Apr. 9	Slight	Con. fer.	None	....	10.1	7.9	.0006	.0034	.....	.....	....	3.9	.775	*a*
4423	Apr. 9	Mod'ate	S. fine	None	....	10.8	8.1	.0016	.0094	.....	.....	.. .	3.9	.240	*b*
4424	Apr. 9	Mod'ate	S. fine	None	....	15.2	10.5	.0044	.0064	.....	.....	. ..	6.0	.60	*c*
4470	Apr. 26	Consid.	Con. fer.	None	....	15.3	12.5	.0004	.0214	... .	.....	....	7.4	.60	*a*
4471	Apr. 26	Mod. op.	Con. silty	Foreign	....	12.7	9.3	.0006	.0180	.....	.....	....	3.2	.125	*c*
4472	Apr. 26	Sl. opal	V. slight	Foreign	....	7 8	5.5	.0004	.0060	.....	.....	...	2.6	.005	*b*

Chemical Examination of Water from No. 9 Catch Basin, Springs Supply.

4244	1906 Dec. 21	V. slight	S. ferrug.	None	0.00	.....	.....	.0020	.0020	.....	.0000	.40	....	.09	...
4387	1907 Mar. 27	Consid.	Mod. fer.	None	0 25	10.0	7.9	.0016	.0090	.0000	.0000	.48	4.8	.40	...
4419	Apr. 9	Heavy	Mark. fer.	None	....	21.5	14.7	.0006	.0124	.....	.....	....	10.3	1.90	*a*
4420	Apr. 9	Mod'ate	S. ferrug.	None	....	9.9	6.4	.0046	.0156	.....	.....	....	4.3	.35	*b*
4421	Apr. 9	Mod'ate	S. ferrug.	None	....	13.5	10.5	.0014	.0220	.....	.....	....	6.0	.84	*c*
4473	Apr. 26	Mod'ate	Mod. fer.	S. earthy	....	9.3	7.5	.0010	.0094	.... .	.....	....	3.9	.30	*a*
4474	Apr. 26	Mod. op.	Mod. earthy	Foreign	....	8.2	5.4	.0014	.0086	.....	.....	...	2.6	.045	*c*
4475	Apr. 26	V.S. opal	S. earthy	Foreign	....	8.0	5.5	.0028	.0056	.....	.....	....	2.6	.012	*b*

a **Before filtering.**
b **Aerated and filtered.**
c **After filtering.**

Chemical Examination of Water from Various Sources, Springs Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Iron.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
1420	1903 Aug. 10	Marked	V. much floc.	Veg.	0.04	6.20	3.00	.0054	.0056	.0300	.0000	.38	2.8	.....	*a*
1994	1904 May 27	Slight	V. much red floc.	V. slight	0.03	4.60	3.20	.0022	.0040	.0100	.0000	.43	1.6	.....	*a
3170	1905 Sept. 15	Consid.	Con. fer.	Earthy	0.25	7.4	6.4	.0114	.0154	.0150	.0000	.42	3.1	.....	*b*
3172	Sept. 14	Mod. op.	Mod'rate	Earthy	0.45	7.2	4.7	.0028	.0084	.0200	.0000	.57	1.5	.....	*c
3281	Nov. 1	Opal	Consid. earthy	None	0.10	5.4	4.4	.0014	.0024	.0050	.0000	.57	1.4	.....	*d*
3282	Nov. 1	None	S. floc.	None	0.05	5.8	4.6	.0060	.0044	.0050	.0000	.57	1.5	.....	*e*
3283	Nov. 1	Slight	Con. fer.	Veg.	0.15	8.0	6.3	.0144	.0034	.0050	.0000	.50	1.6	.....	*f*
3599	May 8	S. opal	Heav. fer.	S. veg.	0.30	10.9	8.4	.0090	.0024	.0500	.0000	2.48	....	.....	*g*
3600	May 8	None	V. S. floc.	M. foul	0.00	6.5	5.0	.0014	.0010	.0100	.0000	.55	....	.....	*h*
3602	May 8	V. S. op.	Con. floc.	Foul	0.10	9.5	6.7	.0036	.0020	.0300	Tr.	1.52	....	... .	*g*
3695	1906 June 21	Mod. op.	Con. fer.	S. veg.	0.10	15.5	10.7	.0102	.0044	.0250	.0009	2.50	4.7	1.25	*i*
3696	June 21	None	None	None	0.03	7.0	5.0	.0018	.0014	.0100	.0000	.65	2.7	0.07	*j*
3697	June 21	None	V. slight	None	0.03	6.2	4.6	.0010	.0014	.0100	.0000	.65	1.6	0.10	*k*
3698	June 21	S. opal	Mod. fer.	S. veg.	0.03	17.2	12.7	.0074	.0026	.0100	.0000	1.60	6.3	2.15	*l*
4242	Dec. 21	None	V. slight	None	0.05	.....	.....	.0014	.0042	.....	.0000	.42	1.5	.035	*n*
4243	Dec. 21	None	None	None	0.00	.....	.....	.0016	.0020	.....	.0000	.42	1.9	.001	*m*
4245	Dec. 21	None	V. slight	None	0.00	.....	.....	.0010	.0020	.....	.0000	.65	1.2	.005	*o*
4276	1907 Jan. 9	None	V. slight	None	0.00	.....	.....	.0008	.0000	.0086	.0000	.38	0.7	.006	*g*
4277	Jan. 9	None	S. coarse	S. veg.	0.00	.....	.....	.0005	.0006	.0300	Tr.	.40	0.9	.010	*g*
4278	Jan. 9	S. opal	V. slight	None	0.05	.....	.....	.0008	.0020	.0300	.0000	2.70	6.0	.160	*p*
4279	Jan. 9	.....	.....	.....	0.15	.....	....	.....	.....	.0400	Tr.	.80	2.8	.080	*q*
4691	July 9	Mod. op.	Heav. fer.	None	0.50	9.3	7.0	.0008	.0014	.0100	.0000	.88	3.2	.900	*j*
4732	July 19	None	None	None	0.00	8.5	3.5	.0010	.0002	.0400	.0000	1.24	1.9	.002	*m*

a Brook in Hussey field: *b* Easterly Brook; *c* Westerly Brook; *d* west branch new collecting gallery; *e* spring near catch basin; *f* east branch new collecting gallery; *g* catch basins Nos. 1 and 2; *h* Cate Spring; *i* catch basin No. 4 on long line; *j* catch basin No. 5 on long line; *k* catch basin No. 6 on long line; *l* catch basin No. 8; *m* catch basin No. 10; *n* catch basin No. 11; *o* Red Spring; *p* catch basin No. 12; *q* catch basin No. 18.

Twelve samples representing private supplies were received, three proving of good quality, one good but for lead, one of doubtful quality, while seven were polluted.

DUBLIN.—No public supply. There are but very few wells in use at the present time in the town. The supply is very largely from springs and from the lake, which is fed by springs. There are five hydraulic rams and as many windmills, and several engines in use to pump water to the hilltops, where the summer residences are. Of 14 private supplies examined, five were found good, three good but for lead, one of doubtful character and five polluted.

DUMMER.—No public supply. Water is obtained chiefly from springs, wells and aqueducts.

DUNBARTON.—A private supply, inaugurated in 1904, furnishes water to three families and one public watering place from a spring excavated five feet deep in gravel. There is a standpipe of 100 barrels capacity, from which the water is distributed through 1,300 feet of galvanized iron pipe, service and mains. The remainder of the families are supplied from private wells and springs. Seven private supplies were investigated, two being found good, one good but for lead, three of doubtful character and one polluted.

DURHAM.—Water is furnished by a private company incorporated in 1895, from wells dug about 20 feet deep, through clay. The water is pumped to a standpipe of 75,000 gallons' capacity. The mains are of galvanized iron, about two miles, with lead service pipes. Fifty families, which comprise practically the whole village, take this water. There are no private wells within this area. There are wells in town to which the public have access, and some analyses of such well waters are here given. (See also special report elsewhere.)

Chemical Examination of Water from Faucet of Supply of C. H. Pettee.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
784	1902 Sept. 8	None	None	None	0.0	15.20	9.50	.0012	.0028	.3500	.0003	.58	5.5	...	..
1360	1903 July 21	Marked	Fine floc.	V. slight	0.15	12.80	6.70	.0000	.0000	.0500	.0001	.65	4.5	...	..
1981	1904 May 24	Slight	None	None	0.0	15.20	6.90	.0000	.0016	.2200	.0000	.60	4.7	...	..
2693	1905 Feb. 10	None	V. slight	None	0.10	10.60	7.9	.0110	.0010	.0500	.0000	.65	4.2	...	..
3099	Aug. 20	Mod. op.	Mod.	None	0.00	9.3	7.3	.0020	.0034	.0500	.0004	.33	....	...	*
3100	Aug. 20	S. op.	Slight	S. veg.	0.00	13.4	11.0	.0024	.0022	.0750	.0030	.56	....	...	*
3395	1906 Jan. 15	None	None	M. veg.	0.00	9.2	5.5	.0006	.0044	.0250	.0010	.52	2.3	...	..
4124	Nov. 3	None	None	None	0.05	11.8	9.3	.0006	.0040	.0400	.0000	.52	5.0	...	..
4215	Dec. 10	None	None	None	0.00	12.0	9.0	.0005	.0022	.1700	.0000	.65	6.5	...	..
4118	Dec. 10	Opal	Consid. earthy	Veg.	Opl	17.2	14.7	.0005	.0064	.0450	.0000	.53	6.5	...	..
4223	Dec. 10	V. slight	V. slight	Argil.	0.00	16.5	12.9	.0008	.0026	.0150	.0004	.55	....	...	..
4224	Dec. 10	V. slight	V. slight	Argil.	0.00	10.0	8.4	.0050	.0018	.0250	.0000	.45	....	...	..
5004	Nov. 5	V. slight	Sl. opal	None	0.00	10.4	8.6	.0006	.0010	.0450	.0000	.40	5.0	...	..

Chemical Examination of Water from Well of Albert Young.

4435	1907 Apr. 15	None	V. slight	None	0.00	31.0	22.2	.0008	.0024	.8000	ft. tr.	6.90	12.4	...	*
4772	Aug. 1	None	V. slight	None	0.00	.....	.....	.0016	.0010	.0050	trace	7.16	12.4	...	*

Chemical Examination of Water from Well in Smith Park.

4738	1907 July 22	None	None	None	0.00	.....	.....	.0002	.0004	.1000	trace	.48	6.0	...	*

* B. Coli present.

Chemical Examination of Water from Wells of J. W. Burnham.

4217	1906 Dec. 10	V. slight	V. slight	Slight	0.00	16.8	13.0	.0005	.0024	.1800	.0000	2.50	11.5	...	*a*
4222	Dec. 10	None	V. slight	Slight	0.00	22.5	19.0	.0040	.0048	.1500	.0004	2.00	....	...	*b*
4771	1907 Aug. 1	None	Sl. floc.	Sl. veg.	0.10	.....	.....	.0006	.0028	.4000	trace	1.70	9.6	tr.	..

a Well under large windmill; *b* Well near pond.

Chemical Examination of Water from Bickford Well.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
4216	1906 Dec. 10	None	None	Argil.	0.00	16.3	13.5	.0008	.0030	.1800	.0002	1.45	7.5	...	*

Chemical Examination of Water from Tap at College Creamery.

4212	1906 Dec. 10	None	Slight	Argil.	0.00	18.0	10.0	.0008	.0020	.0150	.0000	.59	6.5	...	..

Chemical Examination of Water from Conant Spring, near Conant Hall.

4213	1906 Dec. 10	None	V. slight	Argil.	0.00	10.0	7.2	.0030	.0024	.1200	.0000	.75	6.5	...	*

Chemical Examination of Water from the Zeta House.

4214	1906 Dec. 10	V. slight	V. slight	Argil.	0.00	12.5	7.5	.0005	.0080	.4500	.0000	1.90	....	...	*

Chemical Examination of Water from the Chas. Hoitt Supply.

4219	1906 Dec. 10	None	None	Slight	0.00	8.5	6.5	.0010	.0024	.0200	.0000	.45	6.0	...	..
4220	Dec. 10	None	V. slight	None	0.00	10.0	8.0	.0006	.0024	.0180	.0000	.45	6.0	...	..

* B. Coli present.

Four other private supplies examined showed two of doubtful quality, two polluted.

EAST KINGSTON.—No public water supply.

EASTON.—No public supply. Water is obtained from individual wells and springs.

EATON.—No public water supply. Two private supplies examined were found to be organically pure though one contained lead.

EFFINGHAM.—No public supply.

ELLSWORTH.—No public supply. Water is obtained wholly from private springs and wells.

ELKINS.—No public supply. The single private supply investigated was found of doubtful character.

ENFIELD.—The Enfield Village Fire District Water Works, built in 1902 and 1903, by Arthur W. Stone of Hartford, Vt., is owned by the precinct. The source of the supply is a pond of 21 acres in area, and an average depth of about eight feet, fed by springs. The watershed is about 2,000 acres, principally cleared land, with only two families living near. The water flows by gravity through four miles of iron pipe. Service pipes are lead. From one fourth to one third of the population are supplied from this system, with additional connections being made each week.

There are also two private systems of water works in town: The Mascoma Aqueduct Company, whose plant was built in 1884. This supply is from a spring two feet in depth, which supplies about 1,000 gallons daily. This is a gravity system, with one mile of lead main pipe, and also lead service pipe. Ten families are supplied with this water, but some of them also have the town water.

The other private system was built by the Enfield Aqueduct Company in 1854, the source being a well 16 feet deep. This, also, is a gravity system with three fourths of a mile of cement-lined lead pipe for a main, and lead service pipes. The average daily consumption from this system is 1,320 gallons, by 40 families, but the town water is also supplied to some of these patrons.

Chemical Examination of Water from Village Fire District Water Works.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
2075	1904 June 20	V. slight	Slight	Dec.veg.	0.45	.....	.....	.....	... .	.0000	.0000	.15	4.1	.....	..
2411	Oct. 6	None	None	S. veg.	0.50	6.6	3.0	.0014	.0200	.0250	.0000	.05	1.2	.....	..
2910	1905 June 19	None	None	S. veg.	0.40	5.5	2.7	.0000	.0116	.0200	.0000	.12	1.6	.....	..
3095	Aug. 18	V. slight	None	S. veg.	0.50	5.7	2.7	.0020	.0152	.0100	.0000	.10	1.8	.....	..
3368	1906 Jan. 5	V. slight	None	None	0.40	4.5	2.2	.0016	.0074	.0050	.0000	.07	2.0	.....	..
3790	July 30	None	Slight	Veg.	0.40	4.8	2.0	.0022	.0168	.0000	.0000	.05	1.6	.....	*
3790	July 30	None	S. fine	Veg.	0.4	4.8	2.0	.0022	.0168	.0000	.0000	.05	1.6	.....	..
4011	Sept. 28	Slight	Mod.fine	Marked veg.	.50	6.5	2.0	.0014	.0204	.0050	.0000	.07	1.9	.....	*
4651	1907 June 21	None	V. slight	Earthy	.40	3.5	1.6	.0008	.0120	.0050	.0000	.05	1.5	.....	..

Chemical Examination of Water from Tap of Mascoma Aqueduct Company.

3079	1905 Aug. 14	Slight	Consid. earthy	Slight	0.00	4.3	3.0	.0000	.0000	.0100	.0000	.07	0.7	.....	..
3372	1906 Jan. 5	None	None	None	0.00	6.2	3.2	.0006	.0016	.0080	.0000	.05	1.1	.....	..
4116	Oct. 31	None	Slight	V. slight	0.15	4.5	2.7	.0006	.0040	.0050	.0000	.07	1.2	.065	..

Chemical Examination of Water from Tap of Enfield Aqueduct Company.

3869	1906 Jan. 5	None	None	None	0.00	11.0	8.2	.0010	.0038	.0750	.0000	.62	6.8	.015	*
4115	Oct. 31	None	Marked	None	0.15	12.2	10.3	.0010	.0052	.0050	.0000	.35	5.8	.....	..
4652	1907 June 21	Mod'ate	Mod'ate	Mod. vg.	0.40	10.6	8.2	.0068	.0060	.0050	ft. tr.	1.18	6.0	present	*

* B. Coli present.

Chemical Examination of Water from the Well Owned by the Baltic Mills.

5541	1908 Aug. 24	None	None	None	0.00	.....	.....	.0004	.0002	.0600	.0000	.38	3.0	.....	..

Of the six samples representing private supplies two proved good, one good but for dissolved lead, one doubtful in character, and two were found unfit for use.

EPPING.—Water for this town is furnished by private wells and springs. River water is furnished by the Village District Water System for use at the box shop, and several families have it for washing purposes.

Chemical Examination of River Water, Village District Water System.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
4994	1907 Oct. 31	Slight	V. slight	S. earthy	0.80	4.7	1.5	.0002	.0110	.006	.0000	.34	0.9	....	*

Chemical Examination of Water from Well of A. W. Mitchell (Semi-Public Supply).

4455	1907 Apr. 22	V.S. opal	Mod. floc.	Slight	0.05	34.9	20.0	.0022	.0040	.75	.0007	6.18	7.4	...	*

* B. Coli present.

Three of the four private supplies examined were found to be polluted, the other being classed as doubtful.

EPSOM.—No public water supply operated by town or private company. Five private spring and well supplies examined showed two of good quality, one doubtful and two unfit for use. One of these supplies showed appreciable quantities of dissolved zinc.

ERROL.—The greater part of the town is supplied with water from brooks and springs on the hillsides, nearly every family having running water to their homes. The water at the hotel is pumped into a large reservoir from Clear Stream, which is fed by brooks and streams in the mountain-side.

EXETER.—No public supply. The Exeter Water Works, owned by a private company, were installed in 1886. The source of the supply is an artificial pond fed by springs and brook.

Chemical Examination of Water from Faucet of Supply of Exeter Water Works.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
749	1902 Aug. 26	V. slight	Decided red floc.	Marked veg.	0.5	7.80	2.80	.0000	.0202	.0000	.0000	.37	2.8	....	..
1358	1903 July 20	None	Floc.	V. slight	0.4	8.20	1.50	.0000	.0096	.0000	.0000	.30	2.2	....	..
1959	1904 May 16	Marked	Much fine	Sl. veg.	0.5	6.70	3.60	.0000	.0144	.0050	.0000	.32	3.2	....	..
2209	July 26	Marked	V. much red floc.	Slight. aromat.	0.5	7.50	4.70	.0006	.0108	.0050	.0000	.42	4.7	....	..
2670	1905 Jan. 30	Consid.	Slight	Dec. vg.	0.50	8.5	5.0	.0080	.0084	.0150	.0000	.45	2.4	....	..
3076	Aug. 14	Slight	S. ferrug.	M. veg.	0.30	9.2	5.5	.0000	.0124	.0050	.0000	.45	2.8	....	..
3381	1906 Jan. 9	Slight	Slight	Veg.	0.60	5.0	4.3	.0044	.0064	.0100	.0000	.57	2.3	....	..
4108	Oct. 29	Mod. op.	Mod. fer.	Stale	0.30	8.3	6.2	.0012	.0124	.0050	.0000	.55	3.2	....	*
4446	1907 Apr. 15	V. slight	V. slight	S. foul	0.10	5.5	3.5	.0020	.0028	.0050	.0000	.50	2.3	....	..
5146	1908 Feb. 27	S. opal	Marked earthy	V. slight	0.10	5.0	4.0	.0012	.0044	.0070	.0000	.57	1.9	....	..
5145	Feb. 27	Slight	Slight	Marked earthy	0.10	4.8	3.0	.0004	.0036	.0070	.0000	.66	1.2	....	..
5144	Feb. 27	S. opal	Slight	Marked earthy	0.05	4.5	3.0	.0006	.0034	.0030	.0000	.60	1.2	....	..
5143	Feb. 27	V. ft. op.	None	S. earthy	0.00	6.0	3.5	.0010	.0058	.0050	.0000	.65	1.2	....	..
5142	Feb. 27	Con. op.	S. earthy	Marked earthy	Cl.	6.3	4.0	.0016	.0120	.0060	.0000	.68	0.4	....	*
5359	June 20	None	V. slight	Veg.	0.10	.....	....	.0002	.0040	.0060	.0000	.12	3.2	....	..

* B. Coli present.

Of the five samples representing private supplies, one was reported as good, one of doubtful quality, three being polluted.

FARMINGTON.—The town owns and operates a water supply from two springs 12 feet deep. The water is distributed from a reservoir.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
853	1902 Oct. 10	None	Slight	V. slight	0.0	5.9	3.0	.0000	.0020	.0200	.0000	.45	3.0	....	..
3092	1905 Aug. 17	None	V. slight	None	0.0	17.0	11.3	.0080	.0010	.2500	.0010	3.15	4.4	....	*
3477	1906 Feb. 20	None	S. fibrous	None	0.0	15.3	12.3	.0014	.0014	.5000	.0005	2.52	4.4	....	..
4350	1907 Feb. 25	V. slight	Con. floc.	Peculiar	0.05	.....	....	.0054	.0036	.7500	Tr.	2.6	5.6	....	..
4937	Oct. 10	None	None	None	0.00	19.2	14.9	.0012	.0016	.0400	Tr.	2.62	4.6	....	..
5225	1908 Apr. 14	None	None	None	0.00	14.5	8.5	.0006	.0018	.0400	V. ft. trace	2.66	4.6	....	..

* B. Coli present.

The two private supplies examined were found of good quality.

FITZWILLIAM.—Water in this town is from private wells and springs. Seven private supplies investigated showed three of good quality, two good but for dissolved lead, one doubtful and one polluted.

FRANCESTOWN.—A private supply, inaugurated 25 years ago, is from a spring. The watershed is cleared, but no inhabitants. Wells are excavated 12 feet deep, and the water flows by gravity through half a mile of enameled iron pipe, both service and mains. Twenty families have this water, one tenth of the population. There are private wells within this area.

Chemical Examination of Water from Spring Reservoir.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
783	1902 Sept. 6	None	None	V. slight	0.00	8.5	4.0	.0000	.0000	.3000	.0000	.10	2.7	....	..
3084	1905 Aug. 15	None	None	None	0.07	7.0	4.6	.0008	.0008	.0920	.0000	.15	1.8	....	*
5360	1908 June 20	None	None	None	0.05	.....	....	.0002	.0006	.0150	.0000	.09	2.6	....	..

* B. Coli present.

Four private supplies investigated showed two of good quality, one doubtful and one unfit for use.

FRANCONIA.—No public supply. A private company, known as the Franconia Water Supply Company, in 1888 or 1889, introduced a water supply from a spring a mile and a half distant. A later supply, introduced in 1907 by Whipple and Priest, is taken from the Gale River Spring.

Chemical Examination of Water of the Franconia Water Supply Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
387	1902 Feb. 1	None	Floc.	Earthy veg.	0.2	5.90	1.30	.0000	.0086	.0210	.0000	.10	1.3	.....	..
1357	1903 July 19	None	None	None	1.0	6.70	2.00	.0000	.0000	.0200	.0000	.05	1.8	.....	..
2678	1905 Feb. 1	None	M. fine	None	0.05	6.1	3.9	.0000	.0000	.0600	.0000	.25	1.6	.....	..
8390	1906 Jan. 11	None	S. fine	S. veg.	0.10	7.3	4.8	.0010	.0026	.0300	.0000	.30	2.2	.....	..
4177	Nov. 20	None	V. slight	None	0.20	4.5	3.0	.0010	.0094	.0400	.0000	.22	2.4	.....	..
4664	1907 June 24	None	S. coarse	Marked swampy	0.40	5.5	3.2	.0004	.0040	.0050	.0000	.07	1.1	.....	*
4665	June 24	None	None	V. slight	0.00	.....	....	.0002	.0006	.0500	.0000	.88	1.9	.....	*

* B. Coli present.

Chemical Examination of Water from Gale River Spring.

4958	1907 Oct. 15	None	V. slight	None	0.00	4.5	2.6	.0002	.0014	.0020	.0000	.11	1.9	.....	
5229	1908 Apr. 13	None	None	None	0.00	4.5	2.5	.0002	.0004	.0080	.0000	.06	1.9	.....	

FRANKLIN.—The Franklin Water Works, owned by the city, were built in 1891. The source consisted originally of springs, the water being pumped into a covered reservoir about 20 feet deep. Later, to obviate the necessity for direct pumpage from the Pemigewasset River during periods of drouth, a series of driven and tubular wells was constructed along the river bank. During 1906 the supply was further augmented by the construction of some catch basins which serve to collect the water from an extensive springy area lying at the base of a hill.

A still later arrangement, introduced during the summer of 1908, consists in the use of filtered river water, obtained as follows:

"A pump forces water from the Pemigewasset river into a cistern constructed near by on a sandy formation of ground, and the water percolates through the sand into wells some distance away. From the wells it is pumped into the reservoir on the hill. The distance the water travels from the cistern to the wells insures a very thorough filtration, and the examinations of the water have proved that it is satisfactorily purified.

"The commissioners now figure that one large well constructed at a suitable distance from the cistern would catch larger quantities of the filtered water, and still further increase the present supply. The interval land where the wells are located includes several acres of sandy soil, making an ideal place for a natural filtration system."

While this plan will undoubtedly prove satisfactory for the present, its permanently successful operation is open to question.

Chemical Examination of Water from Franklin Town Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
	1901														
78	July 24	None	None	None	0.0	3.90	2.70	.0036	.0052	.0200	.0000	.14	....	.0100	..
337	Dec. 20	None	None	S. veg.	0.05	3.40	2.10	.0008	.0034	.0400	.0000	.18	0.8	.....	..
338	Dec. 20	None	None	S. veg.	0.05	4.00	2.40	.0014	.0050	.0220	.0000	.16	0.8	.....	..
	1902														
804	Sept. 15	None	None	None	0.0	6.50	3.30	.0000	.0016	.0200	.0000	.27	2.0	.....	..
849	Oct. 8	None	None	None	0.0	.....	....	.....	.....	.0200	.0000	...	....	.000	..
870	Oct. 15	None	None	None	0.0	.....	....	.....	.....	.0300	.0000	.17	....	.0870	..
	1903														
986	Jan. 14	None	None	S. veg.	0.0	9.10	3.20	.0000	.0010	.0200	.0000	.15	1.2	.000	..
1166	Apr. 27	None	None	None	0.0	3.60	1.60	.0000	.0000	.0100	.0000	.15	1.6	.0560	..
1288	July 1	None	None	S. veg.	0.0	6.20	2.20	.0000	.0016	.0200	.0000	.15	1.8	T.	..
1351	July 20	None	None	None	0.0	4.40	2.60	.0000	.0014	.0000	.0000	.20	1.4	.. ..	..
1599	Oct. 15	None	None	V. slight	0.0	5.10	1.20	.0000	.0040	.0300	.0000	.15	1.1	.0400	..
1699	Nov. 24	None	None	Aromat.	0.0	3.50	2.00	.0006	.0070	.0000	.0000	.20	1.2	.0080	..
1702	Nov. 24	None	None	None	0.05	4.20	2.70	.0010	.0060	.0000	.0000	.20	1.8	.0130	..
1724	Dec. 15	None	None	S. veg.	0.0	4.90	3.00	.0000	.0012	.0400	.0001	.30	1.9	.....	..
1725	Dec. 15	Marked	M. floc. veg.	V. S.veg.	0.05	3.40	1.60	.0020	.0070	.0100	.0000	.15	1.5	.....	..
1754	Dec. 22	V. slight	None	S. veg.	0.1	3.80	2.50	.0000	.0014	.0000	.0000	.25	1.6	.0090	..
1844	Feb. 18	None	S. veg.	None	0.0	3.00	2.00	.0006	.0016	.0050	.0000	.15	1.8	.....	..
1879	Mar. 29	Slight	V. slight	S. veg.	0.1	4.80	2.10	.0006	.0022	.0800	.0000	.15	1.6	.....	..
1922	May 5	None	None	S. veg.	0.05	5.20	3.00	.0024	.0026	.0250	.0000	.20	1.8	.....	..
2093	June 27	Slight	None	V. slight	0.0	2.50	.90	.0010	.0024	.0000	.0000	.20	1.0	.....	..
2435	Oct. 12	None	None	V. slight	0.00	3.8	2.7	.0000	.0010	.0000	.0000	.20	1.8	.....	*
2460	Oct. 20	None	None	V. slight	0.00	4.4	3.4	.0000	.0014	.0000	.0000	.22	1.8	.....	*
2540	Nov. 15	None	None	V. slight	0.05	4.8	3.5	.0000	.0000	.0250	.0000	.22	1.1	.....	e
	1904														
2544	Nov. 16	None	None	None	0.00	4.5	2.7	.0000	.0000	.0350	.0000	.22	1.1	.....	e
2550	Nov. 18	Slight	S. fine	M. veg.	0.00	4.8	3.3	.0000	.0000	.0300	.0000	.22	1.4	.....	f
2589	Dec. 12	None	None	S. earthy	0.00	7.5	6.0	.0000	.0010	.0150	.0000	.25	1.2	.....	*
2599	Dec. 19	None	Consid. fine	S. earthy	0.00	6.0	3.0	.0000	.0000	.0400	.0000	.25	1.6	.....	f
	1905														
2622	Jan. 2	None	S. fine	S. earthy	0.00	4.8	3.0	.0000	.0000	.0280	.0000	.25	1.1	. ...	..
2647	Jan. 17	Slight	M. floc.	None	0.25	4.8	3.5	.0000	.0000	.0150	.0000	.20	0.6	.....	h

Chemical Examination of Water from Franklin Town Supply.—Continued.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
2649	1905 Jan. 17	None	None	Slight	0.15	4.4	2.9	.0000	.0024	.0100	.0000	.15	0.4	.....	*j
2650	Jan. 17	V. slight	Consid. floc.	veg.	0.30	3.7	2.9	.0020	.0010	.0150	.0000	.17	0.9	.....	k
2683	Feb. 7	None	V. slight	None	0.05	9.2	6.9	.0000	.0000	.0550	.0008	.25	2.7	.....	l
2667	Jan. 30	Slight	S. floc.	V. slight	0.15	5.0	3.0	.0000	.0010	.0200	.0000	.15	1.4	.....	m
2694	Feb. 13	None	S. floc.	V. slight	0.00	4.0	2.8	.0010	.0010	.0300	.0000	.30	2.2	.....	n
2709	Feb. 20	Slight	M. floc.	S. foul	0.20	4.2	3.0	.0094	.0000	.0300	.0001	.22	0.6	.....	o
2747	Mar. 13	None	V. slight	S. musty	0.00	8.0	6.0	.0000	.0014	.0300	.0000	.85	3.1	.1100	p
1767	Mar. 27	None	M. floc.	S. earthy	0.05	4.0	3.1	.0000	.0000	.0280	.0000	.20	1.6	.....	*q
2773	Mar. 29	Much	Consid.	S. musty	0.20	4.6	2.0	.0010	.0010	.0250	.0000	.20	1.2	.....	..
2778	Mar. 30	None	S. fine	Slight	0.10	4.9	3.4	.0014	.0014	.0250	.0000	.20	1.6	.....	..
2782	Mar. 31	None	Consid.	S. earthy	0.10	4.5	3.0	.0000	.0000	.020	.0000	.20	1.6	.....	..
2784	Apr. 1	None	Consid.	None	0.10	4.5	2.6	.0014	.0000	.0200	.0000	.20	1.1	.....	..
2787	Apr. 3	None	Consid.	None	0.10	4.5	2.7	.0014	.0010	.0200	.0000	.20	1.1	.....	..
2789	Apr. 4	None	V. slight	None	0.05	4.5	3.0	.0014	.0010	.0150	.0000	.20	1.1	.....	..
2792	Apr. 6	Slight	Slight	Slight	0.10	4.2	2.3	.0000	.0014	.0150	.0000	.20	1.1	.....	..
2810	Apr. 24	None	Slight	None	0.10	4.0	2.3	.0000	.0014	.0150	.0000	.22	1.2	.....	*
2837	May 10	None	V. slight	Veg.	0.00	5.8	3.8	.0000	.0000	.0250	.0000	.22	1.4	.....	..
2842	May 11	None	Consid.	V. slight	0.00	13.7	8.2	.0000	.0010	.0250	.0000	.25	6.2	.....	..
2847	May 13	Slight	S. floc.	Slight	0.00	5.1	3.2	.0010	.0000	.0300	.0000	.20	1.1	.....	..
2849	May 15	None	V. slight	V. slight	0.00	5.1	3.1	.0000	.0000	.0300	.0000	.20	1.1	.....	..
2850	May 16	None	None	None	0.10	5.1	3.3	.0000	.0000	.0300	.0000	.20	1.1	.....	..
2853	May 17	None	V. slight	None	0.00	5.7	3.7	.0000	.0000	.0300	.0000	.20	1.2	.....	..
2854	May 18	None	V. slight	Earthy	0.00	5.7	2.8	.0010	.0000	.0200	.0000	.20	1.1	.....	..
2857	May 19	None	None	None	0.00	5.80	4.0	.0010	.0000	.0200	.0000	.20	1.2	.....	..
2860	May 22	Slight	Slight	V. slight	0.05	9.7	6.2	.0000	.0000	.5000	.0000	.93	2.7	....	u
2862	May 22	None	Slight	Slight	0.05	5.1	3.4	.0000	.0000	.1000	.0000	.32	1.4	....	v
3047	Aug. 4	Slight	None	None	0.00	5.7	3.3	.0010	.0016	.0200	.0000	.22	1.2	.....	..
3196	Sept. 26	V. slight	V. slight	S. earthy	0.10	4.9	2.6	.0006	.0060	.0100	.0000	.22	1.8	.....	..
3202	Sept. 27	None	None	None	0.10	4.7	2.8	.0008	.0054	.0200	.0000	.22	1.8	.....	..
3231	Oct. 17	None	None	S. veg.	0.15	4.6	2.9	.0020	.0084	.0100	.0000	.22	1.5	.....	..
3245	Oct. 20	.....	.....	.....	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	*

Chemical Examination of Water from Franklin Town Supply.—Concluded.

Number.	Date of collection.	Appearance			Color.	Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.		Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
3345	1905 Dec. 23	None	None	Veg.	0.05	4.1	2.8	.0022	.0038	.0100	.0000	.20	1.9	...	..
3347	Dec. 28	M. opal	Con. floc.	M. veg.	0.18	9.1	7.0	.0040	.0034	.0250	.0010	.22	4.2	...	*w*
3348	Dec. 28	V. slight	V. slight	S. veg.	0.05	6.0	4.5	.0008	.0030	.0250	.0000	.22	2.0	...	..
3355	1906 Jan. 2	None	None	None	0.00	4.8	3.5	.0010	.0034	.0250	.0000	.22	2.7	...	..
3366	Jan. 5	None	None	None	0.05	4.1	2.4	.0010	.0034	.0100	.0000	.22	1.5	...	..
3375	Jan. 9	None	None	None	0.00	5.3	3.8	.0010	.0014	.0280	.0000	.22	2.0	...	..
3401	Jan. 18	None	None	None	0.00	5.1	3.6	.0010	.0054	.0200	.0000	.22	2.2	...	..
3412	Jan. 25	None	None	None	0.05	5.3	3.6	.0000	.0024	.0200	.0000	.20	1.4	...	*
3429	Feb. 1	None	None	None	0.00	5.3	3.2	.0008	.0010	.0200	.0000	.22	1.2	...	..
3591	May 2	None	None	None	0.00	8.0	2.5	.0014	.0014	.0400	.0000	.22	1.4	...	..
3876	Aug. 22	.....	.....	....	....	.....	....	.....	.....	.....	.....	....	....	...	*x**
3877	Aug. 22	....	.....	.....	....	.....	....	.....	.....	.....	.....	....	....	...	*y*
4035	Oct. 2	Sl. opal	V. slight	None	0.10	6.5	3.5	.0014	.0030	.0100	.0000	.10	1.9	...	*
4411	1907 Apr. 8	Sl. opal	Slight	None	0.00	4.1	2.4	.0012	.0014	.0000	.0000	.23	1.6	...	..
4557	May 22	None	Slight gelatinous	None	0.05	4.5	3.1	.0020	.0022	.0050	.0000	.20	1.6	...	..
4667	June 25	None	S. fine	None	0.00	4.6	3.5	.0002	.0006	.0050	.0000	.30	1.9	...	*
4680	July 8	.....	.....	.....	....	.....	....	.....	.....	.....	.....	....	....	...	*
4728	July 18	.....	.....	.....	....	.....	....	.....	.....	.....	.....	....	....	...	*
4729	July 18	....	.....	.....	....	.....	....	.....	.....	.....	.....	....	....	...	*
4730	July 18	.....	.....	....	...	.....	....	.....	.....	.....	.....	....	....	...	†
4811	.....	.....	.....	.....	....	.....	....	.....	.....	.....	.....	....	....	...	†
4812	.....	.....	.....	.....	....	.....	....	.....	.....	.....	.....	....	....	...	†
4813	... .	.....	.....	.....	....	.....	....	.....	.....	.....	.....	....	....	...	*
4829½	Aug. 26	... .	.....	.....	....	.....	....	.....	.....	.....	.....	....	....	...	†
4897	Sept. 23	None	None	None....	0.00	4.5	3.4	.0002	.0030	.0000	.0000	.10	1.2	...	..
5069	July 13	.....	.....	.....	....	.....	....	.....	.....	.....	.....	....	....	...	†
5187	1908 Mar. 24	Mod. opal	Slight	None....	0.5	4.0	2.7	.0002	.0028	.0030	.0000	.18	1.2	...	..

* B. Coli present; † B. Coli absent; *e* test well No. 8; *f* driven well No. 9; *h* Ward's Brook; *j* Webster Lake; *k* Giles Brook; *l* well No. 4; *m* well No. 16; *n* well No. 5; *o* well No. 7; *p* spring; *q* all the wells after being pumped 24 hours; *u* brick wall; *v* wood covered reservoir; *w* large well.

Chemical Examination of the Water from Pemigewasset River.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
1812	1904 Jan. 25	Slight	Slight	S.earthy	0.0	2.60	1.40	.0020	.0048	.0000	.0000	.05	1.0	...	...
1815	Jan. 25	None	None	None	0.0	2.60	1.60	.0014	.0022	.0000	.0000	.05	1.1	...	...
1842	Feb. 18	Slight	Floc. veg.	None	0.0	2.60	1.80	.0008	.0032	.0000	.0000	.15	1.4	...	...
2600	Dec. 19	None	Consid. floc.	Slight	0.20	8.2	4.6	.0000	.0014	.0150	.0002	.12	1.6	...	*
2791	Apr. 6	Slight	Slight	None	0.30	4.8	1.9	.0000	.0054	.0150	.0000	.07	0.7	...	...

* B. Coli present.

Forty-nine samples representing private supplies were received; of these 16 were found of good quality, 14 good but for dissolved lead, 9 were classed as doubtful, and 10 were unfit for use.

Freedom.—No public supply. Some three fourths of the families in town are supplied with water from springs through iron and lead pipes. A few wells are still used. Three private supplies were examined, and all found to be free from organic pollution, though one contained an excess of lead.

Fremont.—No public or private water system. The single private supply examined was found to be good.

Gilford.—This is a farming town, and all have wells or springs from which they get water.

Gilmanton.—The water supply is from private wells that have been dug and walled generally; a few have been driven, and there are a few families who take their water in pipes from living springs. The people are more careful than formerly in regard to drainage. There has been only one case of typhoid fever in the central part of the town in thirty years, and that was contracted elsewhere. Of eight private supplies examined, four were found good, two of doubtful quality, two polluted.

Gilsum.—No public supplies. Several spring supplies are utilized by several families, although wells are chiefly depended upon for water. The single private supply examined was found to be polluted.

Goffstown.—The present system was built in 1891 by the Goffstown Fire Precinct, Goffstown Village. The reservoir from which the water

supply comes is situated between the Uncanoonuc Mountains and is surrounded by woodland. The reservoir is fed by springs in the bottom of the reservoir; by a brook, fed by springs flowing from the northeastern slope of the north mountain; and from a swamp flowing into the brook near the mouth of the reservoir. In addition to the above there has recently been built a storage reservoir of larger capacity than this one; both are at the base of Uncanoonuc Mountains. The quality of this supply has recently improved, the color being much reduced.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
	1901														
201	Oct. 10	None	Floc. veg.	Dec.veg.	1.40	5.60	2.20	.0042	.0276	.0000	.0002	.17	....	....	..
	1902														
795	Sept. 11	None	None	Dec.veg.	1.90	8.70	2.00	.0028	.0234	.0000	.0002	.11	2.0	....	..
	1903														
1388	July 29	Slight	Floc. veg.	Dec.veg.	1.1	8.00	1.10	.0014	.0202	.0000	.0000	.16	0.9	....	..
	1904														
1962	May 17	None	None	V. slight veg.	0.9	4.20	1.80	.0000	.0080	.0000	.0000	.13	1.7	....	..
	1905														
2666	Jan. 30	None	None	S. veg.	1.30	6.0	2.6	.0000	.0120	.0000	.0000	.15	0.7	....	..
3154	Sept. 9	None	None	Veg.	2.20	9.3	2.6	.0010	.0314	.0100	.0000	.10	1.5	....	..
	1906														
3370	Jan. 10	None	None	Veg.	0.80	4.8	2.0	.0014	.0024	.0100	.0000	.10	0.9	....	..
4174	Nov. 21	None	None	None	0.30	4.3	2.8	.0014	.0070	.0100	.0000	.25	0.4	....	..
	1907														
4448	Apr. 16	None	V. slight	None	0.10	2.5	0.9	.0010	.0028	.0050	.0000	.23	0.4	....	..
4965	Oct. 18	None	None	None	0.20	3.2	2.3	.0012	.0096	.0040	.0000	.15	0.4	....	..
	1908														
5233	Apr. 15	None	None	None	0.00	2.5	1.0	.0004	.0014	.0060	.0000	.10	0.4	....	..
5430	July 20	V. ft. op.	Slight	Mk. foul	0.10	3.0	1.7	.0008	.0062	.0120	.0000	.11	1.8	....	..

One of the two private supplies examined was found to be organically pure though containing an excess of lead. The other was classed as doubtful.

Gorham.—No public supply. The Alpine Aqueduct Company, organized in 1873, furnishes water to 160 families, one half the population, from 19 springs, three to seven feet deep, stoned and covered.

One private supply was found of doubtful quality.

Chemical Examination of Water from a Faucet of the Alpine Aqueduct Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
799	1902 Sept. 11	None	None	None	0.0	7.40	4.80	.0000	.0000	.0000	.0000	.10	1.9	....	..
1352	1903 July 18	None	None	None	0.0	5.80	1.20	.0000	.0014	.0000	.0000	.05	1.1	....	..
1957	1904 May 15	None	None	V. slight	0.0	4.80	3.70	.0014	.0030	.0000	.0000	.07	2.0	....	..
2672	1905 Jan. 30	None	None	None	0.05	6.0	4.3	.0000	.0000	.0200	.0000	.07	1.6	...	..
2813	Apr. 24	None	S. veg.	None	0.28	5.5	2.3	.0000	.0014	.0250	.0000	.15	0.7	....	*a*
2814	Apr. 24	None	Slight	None	0.28	4.5	2.4	.0000	.0022	.0000	.0000	.07	0.1	....	*b*
2815	Apr. 24	None	None	None	0.00	5.0	3.3	.0000	.0008	.0100	.0000	.15	0.7	....	..
2816	Apr. 24	None	V. slight	None	0.10	4.8	3.1	.0000	.0010	.0000	.0000	.05	0.4	....	*c*
3204	Sept. 27	None	Slight	None	0.10	5.1	3.1	.0007	.0020	.0100	.0000	.05	1.2	....	..
3385	1906 Jan. 10	None	None	None	0.00	4.4	2.7	.0014	.0010	.0100	.0000	.05	1.5	....	..
4112	Oct. 30	None	None	Marked veg.	0.05	5.7	2.8	.0008	.0048	.0050	.0000	.07	1.2	....	..
4436	1907 Apr. 15	None	V. slight	Arom'tic	0.10	3.1	2.0	.0016	.0020	.0200	.0000	.05	1.2	....	..
4939	Oct. 9	None	None	None	0.35	1.8	1.2	.0008	.0044	.0030	.0000	.15	0.9	....	..

a Perkins Brook; *b* South Branch of Moose Brook; *c* Ice from Gulch Brook.

Goshen.—Water is obtained from private wells and springs dug through gravel, sand, loam and rocks. Some of the wells are under buildings, and receive much filth from surface drainage, sink drains, vaults and stables. Two private supplies examined during the past two years were found to be of good quality, though one contained an excess of lead.

Grafton.—The water supply is from private springs and wells dug from 12 to 60 feet deep, through gravel. Both lead and iron pipe is used. Of five private supplies examined, three were found good, one polluted, while two of this number showed much lead.

Grantham.—No public supply. Water is obtained entirely from private wells and springs. The two private supplies examined were both found of good quality.

Greenfield.—There is no public water supply. Water is obtained from wells dug four or five feet deep, in sandy soil, and flows by gravity

one eighth of a mile through lead pipe. In two instances two or three families have shared the expense and have the same supply. Twelve private supplies were investigated, four being found good, one good but for lead content, two of doubtful character and five polluted.

GREENLAND.—With but one or two exceptions each farm has its private well. A few small places use filtered cistern water. Six families use spring water, brought to the house by means of a hydraulic ram. The springs are shallow, with sandy bottom; wells are dug, with the exception of two or three driven wells, the depth varying with the location. The situation of some of the wells, as regards sink-drains, cow-yards and privy vaults, is not of the best, so that after heavy showers and rains surface waters have caused a change in the character of the water. Of the three private supplies examined, two were found good and one was classed as of doubtful quality.

GREENVILLE.—The town owns and operates a small water supply in the form of an artesian well 425 feet deep, ending in solid rock, and most of the distance below 125 feet in solid rock. The water is pumped to a brick reservoir of 20,000 gallons' capacity. There is one mile of wood main pipe, while the service pipes are of galvanized iron. Sixteen families and two schools take from this supply—25 per cent. of the population. There are many private wells within this area, but none to which the public have access.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
753	1902 Aug. 27	None	None	None	0.00	12.40	8.7	.0000	.0000	.0200	.0000	.12	3.9	....	..
2699	1905 Feb. 14	Much	Slight	V. slight	0.10	11.5	10.0	.0020	.0000	.0000	.0000	.15	3.9	....	..
2970	July 10	V. slight	Slight	S. foul	0.15	12.3	9.9	.0008	.0016	.0120	.0000	.17	4.5	....	..
3135	Sept. 1	V. slight	S. opal	Clayey	....	12.2	7.1	.0022	.0022	.0000	.0000	.16	4.0	....	..
3400	1906 Jan. 18	Heavy	Consid. ferrug.	None	0.50	17.8	13.5	.0014	.0074	.0050	.0005	.22	4.6	....	..
3417	Jan. 29	V. slight	None	None	0.10	13.3	8.5	.0014	.0034	.0050	.0001	.27	4.3	....	..
3649	May 31	M. opal	None	Veg.	0.20	13.5	9.8	.0010	.0014	.0050	.0000	.10	...	....	..
4123	Nov. 2	Slight	S. fine	S. veg.	0.10	14.0	10.1	.0008	.0036	.0050	.0000	.10	4.5	....	..

Ten samples representing private supplies were received, one representing good water, one good but for lead, one doubtful and seven polluted.

GROTON.—No public supply. Water is obtained from individual springs and wells. Two samples received from this town were both found to contain considerable lead.

HAMPSTEAD.—Water supply is from wells. Two polluted supplies and one of doubtful character were sampled.

HAMPTON.—In 1907 the Hampton Water Works Company constructed and put in operation at the Hampton Beach Village Precinct a system of water works, the source being 13 driven wells from 16 to 21 feet deep. Located at the so-called Gill's Spring, with a collecting basin 16 feet deep. The rate of water flow is 260 gallons. The geological formation is gravel and coarse, sharp sand.

Water is pumped to steel stand pipe 15 feet by 90 feet, located on Great Boar's Head. There are four miles of cast iron distributing mains, while the service pipes are of galvanized wrought iron.

One hundred and thirty families are using the supply, which constitutes, approximately, 50 per cent. of the population of the locality.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
4654	1907 June 20	None	Slight	Earthy	0.00	10.3	7.8	.0012	.0002	.0150	.0000	1.34	3.6	....	..
4655	June 20	None	S. fine	Earthy	0.00	9.6	7.5	.0004	.0002	.0050	.0000	1.25	3.2	....	..
4774	July 30	S. opal	S. fine	Arom'tic	Cl.	10.5	9.7	.0016	.0028	.0100	High	1.35	4.6	....	*
5238	1908 Apr. 24	None	More earthy	Veg.	0.05	8.8	6.3	.0004	.0002	.0050	.0000	1.21	3.1	....	..
5383	June 26	None	None	None	0.10	10.3	6.7	.0010	.0004	.0500	.0000	1.40	3.9	....	*a*
5385	June 26	V. slight	None	S. foul	0.05	8.5	5.0	.0002	.0002	.0750	.0000	1.46	3.2	....	*b*
5510	Aug. 13	None	None	None	0.00	13.5	....	.0016	.0002	.2000	.0006	1.40	3.7	....	..
5511	Aug. 13	None	None	Foul	0.00	24.8	....	.0064	.0020	.0750	.0007	9.60	4.6	....	..

a Dead end of line; *b* Faucet in pumping station. * Colon B. present.

Of the 14 private supplies investigated, one was classed as good, four as doubtful and nine polluted.

HAMPTON FALLS.—No public supply.

42A. HANCOCK.—A new supply, instituted in 1907, is obtained from Eaton's Brook. The latter is impounded by a dam and the resulting

reservoir, located about two miles from the village, consists of a deep and narrow ravine, which was completely denuded of surface débris before flowing. Its capacity is 2,000,000 gallons. The mains are of iron, with galvanized iron service pipe. Twenty-five families, equivalent to about 75 per cent. of the village population, now use this supply.

Chemical Examination of Water from Eaton's Brook and Tributaries.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
3040	1905 Aug. 1	None	S. veg.	Con.veg.	0.30	5.0	3.0	.0008	.0072	.0300	.0000	.10	1.1	..	*a
3055	Aug. 6	None	V. slight	Slight	0.15	10.4	5.0	.0006	.0036	.0150	.0000	.10	1.1	..	*a
3123	Aug. 30	None	None	None	0.05	4.0	2.1	.0030	.0038	.0100	.0000	.06	....	..	*b
3391	1906 Jan. 15	None	S. coarse	None	0.10	3.8	2.2	.0010	.0064	.0100	.0000	.10	0.03	..	b
4104	Oct. 28	None	V. slight	S. veg.	0.30	4.5	3.0	.0014	.0124	.0050	.0000	.05	1.2	..	*
4388	1907 Mar. 27	Consid.	Mod. earthy	Swampy	0.20	3.1	1.7	.0004	.0004	.0220	.0000	.13	0.4	..	*
4394	Apr. 3	None	V. slight	V. slight	0.15	4.2	2.0	.0012	.0034	.0200	.0000	.13	0.4	..	....
4463	Apr. 25	None	S. fine	None	0.12	5.3	2.4	.0012	.0030	.0070	.0000	.14	1.6	..	....
4940	Oct. 10	None	None	None	0.25	2.1	1.5	.0010	.0042	.0030	.0000	.20	1.2	..	....
5265	1908 Apr. 29	None	None	V. slight	0.10	3.9	2.5	.0004	.0034	.0120	.0000	.09	0.4	..	....

* B. Coli present.

Of the two private supplies examined, one was found good, one of doubtful quality.

Hanover.—The Hanover Water Works, installed in 1893, is an impounded water in a large artificial pond. The bed of the pond was a fertile valley, which was not cleared of vegetation before impounding the water. The water has always been colored, rich in dissolved vegetable matter, with occasionally some little taste and odor, though usually not offensive.

During the past two years the color and general quality of this water have shown considerable improvement. The tributaries have been cleared and in part paved with stone; portions of the pond margin have been paved and considerable lengths of brook thoroughly cleared of all bushes and obstructing deposits. The sod of the original meadow, long

ago disintegrated, and the margins one foot from (below) full level lines are clean and sandy.

The Hanover Water Works Company bought all the farms having houses within the drainage area, in March, 1903. Nearly all of these houses have been removed. One farm and house close to the eastern watershed line is still rented to a small family, but the location is such that it is not believed to be the slightest menace to the water supply.

A small beginning has been made toward reforesting the open spaces by setting out young spruces and pine seedlings.

So far as the cast iron mains have been bored into for connections they have been found remarkably free from rust. Lately a section of eight- and six-inch main was taken up and lowered, and the interior of the pipes removed appeared without noticeable rust nodules or any deposit.

The Hanover Aqueduct Association, a private corporation, furnishes a water that is used largely, though not exclusively, for drinking purposes. It is a normal spring water, the wells being eight or nine in number and dug to a depth of 10 to 20 feet, and yielding 4,000 gallons per day. There are very few individual wells in this locality.

There are about 100 taps in operation on this aqueduct. The main is two-inch lead pipe, and the service pipes are generally one-half inch lead; water served through pinhole gauges presumed to deliver 40 gallons daily.

Chemical Examination of Water from supply of the Hanover Water Works Company.

Number.	Date of collection.	Appearance: Turbidity.	Appearance: Sediment.	Appearance: Odor.	Color.	Residue on Evapo'n: Total.	Residue on Evapo'n: Fixed.	Ammonia: Free.	Ammonia: Albuminoid.	Nitrogen as: Nitrates.	Nitrogen as: Nitrites.	Chlorine.	Hardness.	Lead.	
....	1893 Oct. 29	Marked	Much	.....	Faint yel. brown	8.10	4.00	.0170	.0240	.0000	.0000	....	2.9	.....	*a*
....	Nov. 27	Marked	.....	.....		7.20	2.68	.0080	.0170	.0000	.0000	....	2.7	.....	*b*
....	Dec. 29	Faint	.....	.....		6.08	3.16	.0038	.0178	.0000	.0000	.10	2.7	.....	*c*
....	1894 Jan. 26	None	None	.....	0.7	8.50	....	.0088	.0224	.0000	.0000	.26	....	.....	*d*
....	Feb. 8	None	None	Foul	0.7	8.50	4.60	.0010	.0132	.0000	.0000	.20	4.1	.....	*e*
....	Mar. 8	None	None	Slight	0.3	10.00	5.70	.....	.....	.....	.....	.40	1.9	.....	*f*
....	Apr. 10	Slight	.....	.....	0.3	4.88	1.80	.....	.....	.0400	.0000	.16	....	.....	..
....	Dec. 27	.....	.....	.....	0.7	.....	.....	.0003	.0250	.0200	.0000	.05	2.9	.....	*g*
....	1896 Mar. 20	.....	.....	.....	0.5	5.28	2.64	.0066	.0180	.0000	.0000	.10	1.4	.....	..
798	1902 Sept. 11	V. slight	Slight veg.	V. dec. & earthy	0.55	8.80	3.30	.0020	.0280	.0000	.0000	.09	2.2	.....	..
1353	1903 July 20	Marked	V. much floc.	V. mark. veg.	0.5	7.80	2.20	.0010	.0240	.0000	.0000	.10	2.2	.....	..
1384	July 29	Marked	Floc. veg.	Decayed veg.	0.2	7.70	2.50	.0010	.0214	.0000	.0000	.07	2.0	.....	..
1385	July 29	Marked	Floc. veg.	Decayed veg.	0.2	8.10	2.40	.0010	.0216	.0000	.0000	.07	2.1	.....	..
1838	1904 Feb. 16	Slight	Fine floc.	V. slight	0.6	8.60	3.20	.0208	.0184	.0000	.0000	.10	2.6	.....	..
1839	Feb. 16	Marked	Con. fine	Slight veg.	0.6	8.20	3.80	.0218	.0184	.0000	.0000	.10	2.7	.....	..
1840	Feb. 16	Slight	Con. floc.	Veg.	0.6	.....	.....	.0218	.0184	.0000	.0000	.10	2.7	.....	..
1865	Mar. 8	Slight	Slight	Marked veg.	0.4	10.10	2.00	.0104	.0126	.0000	.0000	.10	2.2	.....	*h*
1866	Mar. 9	Marked	Slight	Marked veg.	0.5	9.60	2.50	.0236	.0152	.0000	.0000	.15	2.2	.....	..
1886	Apr. 4	V. slight	None	Marked veg.	0.3	4.90	2.40	.0000	.0036	.0000	.0000	.10	2.3	.....	*i*
1887	Apr. 4	V. slight	None	Marked veg.	0.3	6.20	2.80	.0006	.0052	.0000	.0000	.10	2.4	.....	*j*
3148	1905 Sept. 6	Slight	Slight	Veg.	0.50	8.3	3.6	.0016	.0160	.0200	.0000	.07	2.7	.....	..
3267	Sept. 31	V. slight	V. S. fine	S. veg.	0.20	6.3	3.1	.0018	.0112	.0100	.0000	.10	2.8	.....	..
3268	Oct. 31	Slight	Slight	S. veg.	0.40	6.3	3.1	.0024	.0182	.0050	.0000	.10	2.8	.....	..
3434	1906 Feb 1	None	V. slight	None	0.35	7.0	3.3	.0026	.0094	.0050	.0000	.05	2.4	.....	..
4130	Nov. 4	None	Marked veg.	S. veg.	0.35	6.7	3.7	.0086	.0150	.0050	.0000	.05	2.6	None	..
4363	1907 Mar. 16	V. slight	S. fibrous	S. foul	0.00	3.2	....	.0010	.0024	.0050	Ft.tr.	.06	0.6	.....	..
4453	Apr. 18	None	S. earthy	Earthy	0.20	4.5	3.0	.0012	.0106	.0100	.0020	.04	1.9	None	*
4502	May 4	None	S. floc.	S. veg.	0.05	4.7	2.7	.0038	.0074	.0100	.0000	.10	1.9	.....	..
4998	Nov. 5	V. slight	S. coarse	None	0.35	5.5	3.5	.0012	.0120	.0050	.0000	.14	2.6	.....	..
5264	1908 Apr. 29	V. slight	S. floc.	None	0.15	3.6	2.6	.0018	.0068	.0100	.0000	.09	1.6	.....	..

a Reservoir filling; *b* reservoir half full; *c* heavy thaw; *d* heavy thaw; *e* offensive; *f* heavy thaw; *g* sample from pipes; *h* filtered through filter, No. 1; *i* filtered through sand filter, No. 2; *j* filtered through sand filter, No. 1.

HARRISVILLE.—No public supply. Four private supplies were found to be polluted, while a fifth was found of poor quality.

HAVERHILL.—No public supply. The Haverhill Aqueduct Company, a stock company, built a system of water works for the town more than fifty years ago, the source of the supply being a spring. Water flows by gravity through a lead main and service pipes. The village of Woodsville in this town has a public system. For analyses of water see Woodsville.

Chemical Examination of Water from Faucets of Haverhill Aqueduct Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
771	1902 Sept. 3	None	None	None	0.0	6.10	3.90	.0000	.0000	.0300	.0000	.065	3.6	.....	..
1407	1903 Aug. 5	None	None	Slight	0.0	5.00	2.80	.0000	.0000	.0000	.0000	.05	2.7	.....	..
1960	1904 May 16	None	Con. fine	S. veg.	0.0	4.10	3.10	.0056	.0032	.0150	.0000	.08	2.7	.0700	..
1997	May 30	None	None	None	0.0	5.10	3.30	.0000	.0032	.0000	.0000	.10	2.6	.....	..
2536	Nov. 15	None	None	V. slight	0.05	5.3	3.6	.0000	.0030	.0175	.0000	.12	3.2	.....	..
2679	1905 Feb. 2	None	Slight	S. musty	0.05	6.2	3.8	.0000	.0000	.0200	.0000	.10	2.0	.....	..
3407	1906 Jan. 22	None	S. coarse	S. veg.	0.03	5.0	3.2	.0020	.0044	.0100	.0000	.10	2.3	Tr.	..
4109	Oct. 28	None	Slight	None	0.05	8.3	6.0	.0012	.0030	.0100	.0000	.07	2.6	.04	..
4499	1907 May 3	Consid.	Much earthy	None	Op.	3.3	1.7	.0022	.0028	.0300	.0000	.08	1.6	.05	..
4990	Oct. 30	Marked	Heavy earthy	None	Op.	9.1	7.1	.0002	.0134	.0060	.0000	.07	2.6	.045	*
5261	1908 Apr. 29	None	None	None	0.05	4.5	2.9	.0004	.0018	.0020	.0000	.07	2.2	.05	..

* B. Coli present.

Nine private supplies were investigated, two proving good, four good but for lead, two of doubtful character and one polluted.

HEBRON.—No public supply. Water is obtained from individual wells and springs. The single private supply investigated was found of good quality.

HENNIKER.—Water is from the private supplies of the Henniker Spring Water Company, installed in 1884, and the Dow System, installed in 1874. The sources are springs and wells. The wells, three in number, are from 15 to 18 feet deep, with four springs used as feeders to them. The force is gravity, with four miles of galvanized iron main and service pipes. One hundred and thirty families, 95 per cent. of the population, take this water.

Chemical Examination of Water from a Faucet of the Henniker Spring Water Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
745	1902 Aug. 26	None	None	None	0.0	5.90	4.50	.0000	.0000	.0100	.0000	.07	2.6	....	..
3127	1905 Aug. 31	None	None	None	0.00	6.5	4.8	.0000	.0012	.0400	.0000	.15	....	....	..
4117	1906 Oct. 31	None	None	None	0.10	6.3	4.3	.0008	.0024	.0050	.0000	.07	1.9	....	..
4451	1907 Apr. 18	None	None	S. musty	0.05	5.0	3.2	.0010	.0010	.0150	.0000	.09	1.2	....	..
4989	Oct. 30	V. slight	V. slight	None	0.30	4.2	2.7	.0004	.0070	.0100	.0000	.08	1.2	....	*
5015	Nov. 14	None	Slight	None	0.05	3.0	2.2	.0006	.0026	.0040	.0000	.30	0.4	....	..
5016	Nov. 14	V.S. opal	V. slight	None	0.05	3.7	2.8	.0002	.0010	.0050	.0000	.16	0.4	....	..
5017	Nov. 13	None	None	None	0.08	5.4	3.7	.0030	.0004	.0100	.0000	.32	1.2	....	*
5262	1908 Apr. 28	None	None	None	0.00	5.0	2.8	.0006	.0004	.0020	.0000	.09	0.4	....	:

* B. Coli present.

Three samples from private supplies were classed as, one good, one good but for dissolved lead and one of doubtful character.

HILL.—No public supply. There are two private supplies in town. One known as the George A. Sumner supply, constructed in 1890, is taken from a stream about a mile long at the dam. The pond thus formed is about one half an acre in area and 10 feet deep. In 1893 a supply from a spring was introduced by Mr. F. R. Woodward. This spring flows about 50 gallons per minute; soil, sand and clay.

Chemical Examination of Water from the Sumner Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
786	1902 Sept. 9	V. slight	V. slight	S. veg.	0.25	8.70	1.50	.0000	.0036	.0000	.0000	.10	1.4	....	..
1207	1903 May 24	V. slight	V. slight	S. veg.	0.20	4.60	3.00	.0000	.0018	.0000	.0000	.10	1.4	....	..
2728	1905 Feb. 28	None	None	None	0.10	5.2	3.1	.0000	.0000	.0150	.0000	.12	1.4	....	..
3067	Aug. 9	.....	.....	.....	....	.....	....	.....	.....	....	.....	...	....	...	*

Chemical Examination of Water from the Woodward Supply.

761	1902 Sept. 2	None	None	None	0.0	6.00	2.50	.0000	.0028	.0700	.0000	.22	1.8	....	..
1208	1903 May 24	None	None	None	0.0	4.40	2.70	.0008	.0076	.1000	.0001	.25	2.6	....	..
2727	1905 Feb. 28	None	None	None	0.10	4.4	3.0	.0000	.0000	.0150	.0000	.12	0.4	....	..
3035	Aug. 1	None	None	Veg.	0.60	5.0	2.0	.0000	.0060	.0400	.0000	.05	0.9	....	*
3066	Aug. 9	Slight	M. floc.	S. veg.	0.15	6.6	4.2	.0006	.0064	.0150	.0000	.07	1.2	....	*
3111	Aug. 22	None	V. slight	Earthy	0.05	3.8	1.8	.0008	.0010	.0000	.0000	.10	....	....	*
3113	Aug. 22	None	V. slight	Slight	0.10	3.5	1.2	.0008	.0022	.0100	.0000	.11	....	....	*
3223	Oct. 10	None	V. slight	S. veg.	0.20	4.7	2.7	.0020	.0060	.0100	.0000	.05	1.1	....	..
3370	Dec. 22	.....	.....	.....	....	.....	....	.....	.....	.....	.....	....	....	....	*
3500	1906 Mar. 5	None	S. fine	None	0.15	1.9	1.4	.0006	.0054	.0050	.0000	.15	0.9	....	..
3718	July 2	None	None	None	0.20	4.2	1.6	.0014	.0070	.0350	.0000	.07	0.7	....	*
3956	Sept. 10	V.S. opal	Slight	Much	0.10	4.6	2.6	.0026	.0070	.0050	.0000	.15	1.1	....	..
3958	Sept. 10	None	S. fine	Slight	0.00	4.5	2.6	.0024	.0040	.0050	.0000	.15	1.1	....	..
4258	Dec. 31	None	S. ferrug.	Veg.	0.05	3.0	2.6	.0008	.0044	.0050	.0000	.11	1.9	....	..
4705	.....	.....	.....	.....	....	.....	....	.....	.....	.....	.....	...	....	....	†
5260	1908 May 1	None	None	None	0.20	2.9	1.7	.0002	.0034	.0150	.0000	.10	.9	....	..
5514	Aug. 18	None	Slight	None	0.15	4.7	3.2	.0002	.0008	.0080	.0000	.12	1.2	....	..

* B. Coli present. † B. Coli absent.

One private supply was found to be contaminated by lead, while a second was polluted.

HILLSBOROUGH.—The Hillsborough Bridge Village Fire Precinct owns a water supply, instituted in the autumn of 1886. The source is a pond of about 500 acres; average depth about 15 feet; bottom, sand and ledge, with natural deposit. The water flows by gravity to intermediate reservoir of 500,000 gallons' capacity. The total length of mains is eight miles, cast iron and cement-lined iron pipe; service pipes mostly galvanized iron. Practically the entire population of the precinct are supplied with this water. There are a few private wells within the area reached by the public supply.

Chemical Examination of Water from Faucet of the Hillsborough Bridge Village Fire Precinct.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
746	1902 Aug. 20	None	None	None	0.2	3.70	1.30	.0000	.0060	.0120	.0000	.12	1.2	....	..
1374	1903 Aug. 27	Slight	Floc. veg.	V. slight	0.2	5.10	1.10	.0000	.0080	.0000	.0000	.08	0.9	....	..
1781	1904 Jan. 4	Slight	Slight	Slight	0.15	4.10	2.00	.0000	.0072	.0000	.0000	.12	1.5	....	..
1967	May 17	V. slight	Slight	None	0.05	3.60	1.90	.0000	.0080	.0000	.0000	.05	1.6	....	..
2685	1905 Feb. 8	None	None	Arom.	0.1	4.2	2.0	.0000	.0076	.0000	.0000	.12	0.4	....	..
3156	Sept. 12	None	None	Earthy	0.15	4.5	2.3	.0006	.0116	.0100	.0000	.07	0.9	....	..
3398	1906 Jan. 17	None	S. fine	S. earthy	0.30	3.7	1.3	.0010	.0050	.0050	.0000	.07	0.9	....	..
4120	Dec. 1	None	None	Earthy	0.10	3.5	1.7	.0010	.0088	.0050	.0000	.07	0.9	....	..
4210	Dec. 6	None	None	Veg.	0.10	3.3	1.3	.0010	.0074	.0050	.0000	.05	0.4	....	..
4281	1907 Jan. 16	None	None	Sl. veg.	0.10	.....	.....	.0080	.0090	.0000	.0000	.05	2.7	....	..
4454	Apr. 18	None	V. slight	Marked earthy	0.20	3.2	1.9	.0016	.0084	.0050	.0000	.13	1.2	....	*
4485	Apr. 30	.....	.....	.....	....	.....	....	.....	.....	.....	.....	...	....	....	*
4510	May 9	.....	.....	.....	....	.....	...	.....	.....	.....	.....	....	....	....	†
4511	May 9	.....	.....	.....	....	.....	...	.....	.....	.....	.....	....	....	....	†
4512	May 9	.....	.....	.....	....	.....	....	.....	.....	.....	.....	....	....	....	*
4529	May 11	.....	.....	.....	....	....	....	.....	.....	.....	.....	....	....	....	†
4861	Sept. 2	V. slight	V. slight	None	0.15	2.0	1.1	.0004	.0094	.0050	.0000	.17	0.4	....	*
5001	Nov. 4	V. slight	V. slight	S. earthy	0.20	2.4	0.7	.0022	.0068	.0040	.0000	.18	0.4	....	..
5263	1908 Apr. 28	None	Slight	None	0.30	3.5	2.2	.0004	.0036	.0100	.0000	.08	0.4	....	..
5558	Aug. 25	V. faint	V. slight	S. earthy	0.10	2.1	1.3	.0002	.0050	.0060	.0000	.13	0.4	....	..

* B. Coli present. † B. Coli not present.

Seventeen samples representing private supplies were received, classified as, five good, five good but for dissolved lead, two doubtful and five polluted.

HINSDALE.—No public supply. Three samples representing private supplies indicated two polluted, one contaminated by lead.

HOLDERNESS.—No public supply. Of the four private supplies investigated, two were found of good quality, one doubtful and one unfit for use.

HOLLIS.—No public water supply. The analysis of a sample representing polluted water, taken from well supplying the public school, was as follows:

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
4759	1907 July 24	None	Sl. fine	Marked earthy	0.05	55.1	40.6	.0084	.0036	.50	.0030	5.19	12.4	....	*

*B. Coli present.

The single private supply examined was classed as doubtful.

HOOKSETT.—A system owned by H. C. Carbee, derived from Pinnacle Pond, supplies a number of families.

Chemical Examination of Water from Pinnacle Pond.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
866	1902 Oct. 16	None	None	S. veg.	0.0	3.40	1.20	.0000	.0042	.0000	.0000	.17	.9	....	..
2569	1904 Dec. 5	V. slight	M. floc.	S. veg.	0.0	2.4	2.0	.0000	.0050	.0050	.0000	.15	0.4	....	..
3399	1906 Jan. 18	V. slight	V. slight	S. veg.	0.0	3.4	2.1	.0010	.0050	.0050	.0000	.15	0.7	....	..

Two lead contaminated and two polluted private supplies were found.

HOPKINTON.—The water works of the Hopkinton Village Aqueduct Association, incorporated, were built about 1841. The water is from wells dug from eight to fifteen feet through sandy loam, sandy gravel, and hardpan, and flows continually, by gravity, to the consumers. There is about three fourths of a mile of cement-lined iron main pipe, with lead service pipes. Forty-three families—about seventy per cent. of the fire district—have this water.

Besides the above families, who have constantly running water, this company supplies a public drinking fountain, the hotel, schools, town and lyceum halls, and public library.

Chemical Examination of Water from Supply of Hopkinton Village Aqueduct Association.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
876	1902 Oct. 16	None	None	None	0.0	8.90	4.20	.0000	.0000	.0300	.0000	.15	1.6	....	..
2146	1904 July 10	None	None	None	0.0	3.60	1.40	.0014	.0008	.0500	.0000	.15	1.4	....	..
3147	1905 Sept. 6	None	S. floc.	V. slight	0.15	8.0	4.2	.0008	.0020	.0250	.0000	.25	1.9	....	..

The village of Contoocook is supplied with a water of good quality from Bear Pond.

Chemical Examination of Water from Contoocook Village Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
4183	1906 Nov. 22	None	None	S. earthy	0.10	3.0	1.5	.0014	.0054	.0100	.0000	.07	0.4	....	..
4445	1907 Apr. 17	None	V. slight	Veg.	0.10	2.7	1.9	.0010	.0030	.0100	.0000	.13	1.2	....	..
4987	Oct. 28	None	None	None	0.00	2.3	1.5	.0002	.0074	.0040	.0000	.19	0.4	....	..
5283	1908 May 6	None	None	S. swampy	0.10	3.4	1.1	.0002	.0028	.0100	.0000	.14	0.4	....	..

The seven private supplies examined were classified as, two good, three good but for dissolved lead, one doubtful and one polluted.

Chemical Examination of Water from Well of Davis Paper Company, Contoocook.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
5483	1908 Aug. 6	Slight	Slight	M. veg.	0.00	.....	....	.0012	.0046	.0040	.0000	.35	4.2	....	..

Hudson. No public supply. The Hudson water works, owned by a private company, were built in 1892. The source of the supply is a well 20 feet deep and 22 feet wide, dug through loam and gravel. The water is pumped to a standpipe 12 feet in diameter and 60 feet high.

Chemical Examination of Water from Well Supplying Town of Hudson.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
69	1901 July 16	None	S. floc.	None	0.0	6.00	3.70	.0014	.0026	.1000	.0000	.40	....	....	..
2744	1905 Mar. 7	None	Slight	None	0.0	5.6	4.4	.000	.0000	.0300	.0000	.37	2.0	....	..
2991	July 18	None	S. floc.	None	0.3	6.0	3.8	.0014	.0060	.0100	.0000	.80	1.6	....	..
3416	1906 Jan. 26	None	None	S. veg.	0.0	6.2	4.2	.0010	.0028	.0300	.0000	.30	1.9	....	..
4185	Nov. 22	None	Slight	Slight	0.05	5.0	4.3	.0006	.0044	.0350	.0000	.35	1.9	....	..

Four private supplies investigated were found to be organically pure, but three showed excessive quantities of dissolved lead.

Jackson.—C. W. Gray & Co. installed a private water supply in 1904. The source is a stream of about 1,000 acres watershed, all wooded, no inhabitants. The water is of excellent quality, taken from a mountain stream about two miles from the village. There is a pressure of about eighty pounds per square inch. About three miles of iron service and wrought iron service pipe is employed in this system. Fifteen families—50 per cent. of the population—are supplied.

Of three private supplies examined, two were found of good quality and one in poor condition.

JAFFREY.—The town instituted a system of water works in 1902, the source being a pond in Rindge having an area of 40 acres, an average depth of 20 feet, with hardpan bottom. The water flows by gravity through nine miles of 12-inch, cast-iron distributing mains; service-pipes, six-inch cast iron.

Chemical Examination of Water from Bullet Pond, Rindge.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
	1901														
186	Oct. 1	None	S. veg.	Dec.veg.	0.12	2.80	1.30	.0016	.0166	.0000	.0000	.16	...	.	..
232	Oct. 20	None	None	Veg.	0.12	....	....	.0016	.0180	.0000	.0000	.09	...	.	..
	1902														
340	Jan. 5	None	None	Veg.	0.2	2.30	1.10	.0032	.0172	.0000	.0000	.08	0.4	.	..
348	Jan. 5	None	None	Veg.	0.2	2.50	1.10	.0032	.0162	.0000	.0000	.09	0.4	.	..
	1903														
1378	July 27	Slight	None	S. musty	0.1	5.10	1.90	.0016	.0058	.0000	.0000	.08	1.4	.	..
1686	Nov. 23	Slight	V. S. fine	V. dec. veg.	0.1	4.00	1.10	.0000	.0144	.0300	.0000	.15	1.2	.	..
1687	Nov. 23	Slight	V. S. fine	Dec.veg.	0.2	4.20	2.10	.0014	.0128	.0200	.0000	.15	1.1	.	..
1758	Dec. 22	Slight	V. slight	V. mark. veg.	0.1	4.20	2.40	.0006	.0062	.0000	.0000	.25	2.3	.	..
1759	Dec. 22	Slight	Slight	V. mark. veg.	0.1	3.90	2.10	.0000	.0074	.0000	.0000	.20	2.3	.	..
	1904														
1955	May 16	Consid.	Much fine	V. arom.	0.2	4.20	2.20	.0000	.0110	.0000	.0000	.18	2.0	.	..
	1905														
2687	Feb. 9	None	None	Slight	0.1	4.3	2.1	.0030	.0120	.0000	.0000	.17	0.7	.	..
3138	Sept. 5	None	None	Slight	0.1	3.7	2.1	.0010	.0136	.0100	.0000	.17	0.9	.	..
	1906														
3463	Jan. 22	None	None	Veg.	0.1	3.5	1.5	.0026	.0074	.0100	.0000	.22	0.7	.	..
3978	Sept.17	None	V. slight	S. veg.	0.15	4.0	1.5	.0010	.0074	.0050	.0000	.17	0.7	.	..
3981	Sept.17	None	V. slight	None	0.10	4.1	1.6	.0030	.0094	.0050	.0000	.15	1.1	.	.
4138	Nov. 7	None	None	Slight	0.05	4.1	2.6	.0014	.0074	.0050	.0000	.10	1.0	.	..
	1907														
4452	Apr. 18	None	None	S. foul	0 10	....	....	.0014	.0052	.0050	.0000	.22	0.4	.	..
5000	Nov. 4	None	None	None	0.05	2.4	1.0	.0012	.0058	.0060	.0000	.19	0.4	.	..
	1908														
5282	May 5	None	None	None	0.15	2.6	1.0	.0004	.0086	.0040	.0000	.12	0.3	.	..

Two private supplies examined were found of good quality, while a third was classed as doubtful.

JEFFERSON.—No public supply. The Waumbek Hotel Company have a fine supply system of their own from natural springs and spring brooks.

*Chemical Examination of Water Supply of the Waumbek Hotel Company.**

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.			
184	1901 Sept. 30	None	None	None	0.0	3.80	1.80	.0016	.0042	.0480	.0000	.03	....	....

* Sample from spring east of main hotel.

The three private supplies examined were all found of good quality.

KEENE.—In 1870 the City of Keene installed a public water supply from two ponds, one 50 acres and the other 110 acres in area; Sylvan Lake having an average depth of 20 feet, and Echo Lake 12 feet. There are also several auxiliary supplies.

About forty miles of cast-iron and cement-lined distributing mains and galvanized iron service pipes constitute this system. Twenty-two hundred persons, 85 per cent. of the population, take from this service. There are no private wells in the area.

Chemical Examination of Water from Keene.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
27	1901 June 24	V. slight	S. floc.	Dec.veg.	0.2	2.80	1.00	.0000	.0169	.0000	.0000	.18	....	...	*a*
455	1902 Mar. 27	Slight	Slight	Veg.	0.23	1.60	.70	.0010	.0122	.0150	.0000	.07	0.7	....	*b*
456	Mar. 27	Slight	Slight	Veg.	0.23	2.00	1.00	.0020	.0076	.0000	.0000	.07	0.7	....	*c*
457	Mar. 27	V. slight	Slight	Veg.	0.32	3.10	.80	.0000	.0052	.0000	.0000	.07	0.6	....	*d*
458	Mar. 27	Marked	Slight	Veg.	0.12	2.10	.80	.0010	.0078	.0000	.0000	.11	0.6	....	*e*
1172	1903 May 3	Slight	Floc. fine	Veg.	0.2	2.80	1.50	.0014	.0198	.0000	.0000	.15	0.9	....	*f*
1173	May 4	Slight	Fine floc.	Veg.	0.15	5.00	2.00	.0014	.0158	.0000	.0000	.15	0.9	....	..
1174	May 4	Slight	Fine floc.	Veg.	0.1	3.00	0 60	.0020	.0202	.0000	.0000	.17	0.6	....	*g*
1175	May 4	Slight	Much fine floc.	Veg.	0.15	4.90	1.60	.0000	.0060	.0000	.0000	.10	0.4	....	..
2725	1905 Feb. 27	None	V. slight	Veg	0.1	4.5	2.6	.0000	.0000	.0100	.0000	.15	0.1	...	..
3150	Sept. 5	None	V. slight	Veg.	0.2	4.8	3.5	.0020	.0116	.0200	.0000	.20	0.4	....	*h*
3406	1906 Jan. 22	None	V. slight	Veg.	0.2	3.6	1.8	.0050	.0064	.0100	.0000	.07	0.7	....	*i*
4145	Nov. 9	None	V. slight	None	0.10	3.7	1.5	.0034	.0134	.0050	.0000	.12	0.4	....	*
4186	Nov. 23	.....	.....	.....	....	.....	....	.....	.....	.....	.....	....	...	....	..
4571	1907 May 27	None	S. floc.	Earthy	0.30	2.8	1.4	.0014	.0036	.0130	.0000	.13	0.1	....	*
4600	.....	None	S. floc.	Earthy	0.30	2.8	1.4	.0014	.0036	.0130	.0000	.13	0.1	....	*
4710	July 18	None	V. slight	S. earthy	0.05	4.1	1.7	.0014	.0004	.0050	.0000	.29	0.6	....	*
5308	1908 May 21	None	V. slight	Slight	0.20	2.6	.9	.0014	.0124	.0080	.0000	.08	0.4	....	..

a Sample from Goose Pond; *b* sample from stream proposed as an additional supply; *c* sample from small stream flowing through an alder swamp; *d* small stream, part of proposed supply; *e* sample from Woodward Pond; *f* sample from intercepting reservoir; *g* sample from Sylvan Lake; *h* sample from Echo Lake; *i* sample from Roaring Brook.
* B. Coli present.

Nine private supplies were examined, showing five of good quality, one good but for lead, one of doubtful character and two polluted.

KENSINGTON.—No public supply.

KINGSTON.—No public supply. The village of Kingston Plains has dug wells, average depth 15 to 20 feet; light loam soil, sand sub-soil.

The single private supply examined was found to be polluted.

LACONIA.—The Laconia Water Company was incorporated in 1885. The supply is from Lake Paugus (Long Bay), a branch of Lake Winnepesaukee. This bay receives the sewage from The Weirs and from numerous cottages along its shores. The reservoir, 135x90 feet, and 18 feet deep, has a capacity of 2,700,000 gallons. There is about 28 miles of cement and cast-iron mains, while the service pipes are wrought iron, cement-lined. About 90 per cent. of the population are supplied from this source. Very few wells.

Chemical Examination of Water Supply of Laconia and Lakeport.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
532	1902 May 19	None	V. slight	S. veg.	0.1	2.80	.90	.0000	.0014	.0000	.0000	.13	.6	....	....
822	Sept. 22	None	None	V. slight	0.1	4.00	1.10	.0000	.0062	.0000	.0000	.11	.6	....	....
2141	1904 July 11	None	None	None	0.4	7.70	4.90	.0022	.0098	.0450	.0008	.20	2.2	....	....
2732	1905 Mar. 1	None	V. slight	None	0.00	3.3	1.3	.0014	.0020	.0000	.0000	.15	0.6	....	*
3145	Sept. 6	V. slight	V. slight	Veg.	0.10	3.2	1.5	.0010	.0080	.0250	.0000	.12	0.9	....	....
3408	1906 Jan. 22	None	None	None	0.07	2.0	1.5	.0010	.0048	.0100	.0000	.17	0.7	....	....
3738	July 10	None	None	S. earthy	0.10	3.1	1.0	.0020	.0084	.0250	.0000	.05	1.0	....	†
3782	July 23	.....	.....	.....	....	.....	....	... ..	.....	.....	.....	....	....	....	† *a*
3783	July 23	.....	.....	.....	....	.....	....	.....	.....	.....	.....	....	....	....	† *b*
3784	July 23	.....	.....	.....	....	.....	....	.....	.....	.....	.....	....	....	....	* *c*
3785	July 23	.....	.....	.....	....	.....	....	.....	.....	.....	.....	....	....	...	* *d*
3786	July 23	.....	.....	.....	....	.....	....	.....	.....	.....	.....	....	....	....	*n e*
3787	July 23	.....	.....	.....	....	.....	....	.....	.. ..	.....	.....	....	....	....	*n f*
4128	Nov. 5	None	None	Veg.	0.10	4.0	2.3	.0014	.0102	.0050	.0000	.05	....	...	....
4460	1907 Apr. 24	None	V. slight	Sl. foul	0.05	2.4	1.9	.0010	.0026	.0130	.0000	.17	1.4	....	....
4785	July 19	None	None	S. earthy	0.00	2.7	1.8	.0006	.0044	.0050	.0000	.18	1.9	....	....
4736	July 19	None	None	None	0.00	.....	....	.0010	.0036	.0050	.0000	.18	1.2	....	....
4832	Aug. 28	... .	.....	.. ..	0.10	2.5	1.5	.0002	.0058	.0050	.0000	.16	1.2	....	....
5003	Nov. 1	None	None	None	0.05	2.1	1.0	.0004	.0036	.0040	.0000	.19	0.7	....	....
5287	1908 May 8	V. slight	V. slight	None	0.12	2.9	.9	.0006	.0034	.0020	.0000	.18	0.7	....	....

* B. Coli present; † B. Coli in check sample; *a* intake Lake Paugus; *b* one mile above intake; *c* midway Big Island to Weirs Channel; *d* near Endicott Rock; *e* midway Weirs to Eagle Island; *f* one mile beyond Eagle Island; *n* no B. Coli present.

In 1903 a water supply was introduced at the State School for Feeble-Minded, the source being Opeechee Lake. Several analyses were made of this water, both before and after the installation of the supply.

Chemical Examination of Water from Opeechee Lake, Water Supply for the State School for the Feeble-Minded.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
1221	1903 June 10	None	Slight fine	V. slight	0.05	3.90	0.60	.0000	.0080	.0000	.0000	15	1.5	....	..
1222	June 10	None	Slight fine	V. slight	0.05	6.20	1.60	.0000	.0074	.0000	.0000	.15	1.5	...	..
2000	1904 May 31	Slight	Slight fine	S. foul	0.05	3.40	1.40	.0000	.0084	.0050	.0000	.15	1.1	....	..
3173	1905 Sept. 17	V. slight	None	None	0.0	3.7	1.5	.0028	.0130	.0050	.0000	.15	0.7	...	..
3474	1906 Feb. 21	None	V. slight	None	0.0	2.7	1.5	.0030	.0080	.0050	.0000	.20	1.2	....	..
4173	Nov. 20	None	V. slight	None	0.10	4.0	3.0	.0034	.0104	.0050	.0000	.17	1.2	....	*

*B. Coli present.

Of the six samples representing private supplies one was found to be of good quality, four doubtful and one unfit for use.

Lancaster.—The Lancaster Water Company's works were installed in 1891, and transferred to the precinct in 1894. The source of the supply is a mountain stream at a sufficient elevation to furnish pressure by gravity, and its reservoir has a capacity of 2,000,000 gallons. The distribution is through some 12 miles of iron mains, 12-inch to 6-inch. The service pipes also are of iron. Four hundred and sixty families, 98 per cent. of the population, are supplied.

Chemical Examination from Faucet of Precinct Water Works.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
813	1902 Sept. 19	None	None	V. slight	0.1	3.40	1.50	.0000	.0012	.0200	.0000	.05	1.5	....	..
1408	1903 Aug. 4	None	None	None	0.1	4.80	1.60	.0000	.0034	.1100	.0000	.10	1.6	....	..
1965	1904 May 17	Slight	Con. fine	S. veg.	0.25	3.60	1.90	.0000	.0150	.0450	.0000	.05	1.4	....	..
2686	1905 Feb. 8	None	None	None	0.05	5.0	2.2	.0000	.0000	.0300	.0000	.05	1.2	....	..
3187	Sept. 20	None	None	Slight	0.20	4.7	1.7	.0020	.0074	.0100	.0000	.05	1.1	....	..
3409	1906 Jan. 23	None	None	None	0.10	3.5	2.5	.0010	.0034	.0200	.0000	.04	0.7	....	..
4486	1907 Apr. 30	V.S. opal	V. slight	None	0.20	3.2	2.0	.0004	.0060	.0100	.0000	.07	1.2	....	..
4985	Oct. 28	None	V. slight	None	0.20	3.3	2.5	.0016	.0030	.0200	.0000	.10	1.2	....	..

The single private supply examined was found to be polluted and to also contain a notable quantity of zinc.

LANDAFF.—No public supply.

LANGDON.—No public supply.

LEBANON.—The water supply is owned by the Fire Precinct, and was installed in 1897. At first the water was taken directly from a stream flowing from Mascoma Lake, later on from wells, 63 x 30 x 15 feet, supplied by 900 feet loose-jointed pipe, fed by water infiltrated from the river.

During 1907 a mechanical filter plant was installed and the river water after a preliminary sedimentation and treatment with coagulant is passed through these filters before pumping to the reservoir. Analyses made thus far indicate that the filtration process is very successful.

Analyses are also here given of two other supplies, the availability of which was under consultation prior to the adoption of the filtration system.

A spring, known as the Kendrick & Davis supply, is also used to some extent.

The village of West Lebanon is furnished with water supplied by the Hartford Water Company, White River Junction, Vt.

Chemical Examination of Water from the Lebanon Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
	1901														
33	June 27	None	S. floc.	S. veg.	0 3	4.60	2.80	.0000	.0115	.0000	.0000	.22	....	...	...
34	June 27	None	Min. matter	V. slight	0.0	7.60	5.80	.0000	.0000	.0100	.0000	.31	....	...	...
53	July 6	Marked	Much min.	None	0.0	6.70	4.10	.0073	.0098	.0000	.0000	.33	....	...	...
54	July 6	None	Min.	None	0.0	6.00	3.40	.0028	.0100	.0000	.....	3.51	....	...	...
	1902														
614	June 25	Slight	V. slight	Arom. veg.	0.2	7.00	2.60	.0006	.0082	.0330	.0000	.12	1.8	...	...
	1903														
1144	Apr. 19	None	None	Dec.veg.	0.0	5.00	3.60	.0000	.0190	.0000	.0000	.12	1.6	...	a
1297	July 6	Slight	Floc.	None	0.15	5.10	2.70	.0000	.0072	.0000	.0000	.10	2.0	...	...
1298	July 6	Slight	Floc. veg.	S. veg.	0.82	5.30	1.70	.0000	.0080	.0000	.0000	.06	1.5	...	a
	1904														
1968	May 18	None	None	V. slight	0.1	4.60	2.80	.0000	.0044	.0000	.0000	.10	2.3	...	...
2251	Aug. 8	Slight	Much floc. red	S. veg.	0.5	5.80	2.70	.0014	.0024	.0000	.0000	.30	2.4	...	*
2293	Aug. 22	None	V. slight	V. slight	0.05	4.00	2.00	.0000	.0020	.0000	.0000	.10	1.8	...	*
2294	Aug. 22	None	None	V. slight	0.05	3.90	1.90	.0000	.0070	.0000	.0000	.10	1.6	...	*
2391	Oct. 3	None	None	None	0.15	4.0	1.7	.0000	.0022	.0000	.0000	.12	2.3	...	*
2397	Oct. 3	None	None	S. earthy	0.00	5.0	1.8	.0096	.0020	.0000	.0001	.10	2.0	...	*a
	1905														
2665	Jan. 29	V. slight	S. fine	S. musty	0.00	19.5	15.6	.0014	.0000	.0000	.0001	2.0	7.4	...	b
2684	Feb. 6	Slight	M. fine	Peculiar	0.05	17.6	15.6	.0020	.0000	.0000	.0004	2.0	7.0	...	b
2949	July 3	None	S. floc.	S. earthy	0.17	5.4	2.9	.0000	.0014	.0000	.0000	.15	1.6	...	*
3140	Sept. 5	None	None	None	0.10	6.7	4.8	.0006	.0060	.0200	.0000	.27	2.7	...	...
3298	Nov. 16	None	None	S. earthy	0.20	5.2	3.0	.0010	.0058	.0100	.0000	.25	2.4	...	...
	1906														
3426	Jan. 31	None	None	None	0.10	5.9	3.4	.0006	.0024	.0050	.0000	.22	2.2	...	...
3792	July 29	None	None	None	0.00	6.3	4.8	.0014	.0044	.0050	.0000	.25	2.2	...	...
3870	Aug. 20	None	None	S. veg.	0.10	7.1	6.1	.0010	.0024	.0000	.0000	.27	3.5	...	*
3948	Sept. 7	None	S. floc.	None	0.15	5.2	2.8	.0036	.0050	.0030	.0000	.05	1.4	...	*
3951	Sept. 7	S. opal	Slight	Earthy	0.40	5.4	2.4	.0036	.0100	.0030	.0000	.05	1.4	...	*
	1907														
4333	Feb. 6	Slight	S. floc.	None	0.20	....	....	.0014	.0076	trace	.0000	.17	1.9	...	a
4483	Apr. 29	None	V. slight	None	0.30	4.8	3 7	.0008	.0040	.0100	.0000	.21	2.6	...	...
4599	July 11	None	S. fine	None	0 05	5.1	3.3	.0010	.0054	.0500	.0000	.15	2.6	...	...
4986	Oct. 28	V. slight	V. slight	Marked earthy	0.30	5 0	3.0	.0012	.0094	.0060	.0000	.23	1.9	...	a

Chemical Examination of Water from the Lebanon Supply.—Concluded.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
5061	1907 Dec. 4	None	None	Slight	0.05	3.8	3.2	.0006	.0060	0050	.0000	.13	2.6	...	*a
5231	1908 Apr. 13	None	None	None	0.00	3.2	1.4	.0006	.0028	.0040	.0000	.09	1.2	...	a
5232	Apr. 13	None	V. slight	V. slight	0.30	3.6	2.2	.0042	.0068	.0100	.0000	.09	1.0	...	*a

* B. Coli present; *a* from Mascoma river; *b* artesian well.

Chemical Examination of Water from the Kendrick & Davis Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
4053	1906 Oct. 9	Consid.	Consid.	S.earthy	.03	.....	....	.0006	.0044	.0100	.0000	.10	2.6	....	..
4068	Oct. 17	None	None	None	.05	7.8	6.2	.0010	.0028	.0200	.0000	.15	2.9	....	..
4126	Nov. 2	None	V. slight	None	.05	5.0	3.5	.0006	.0048	.0080	.0000	.07	2.3	....	..
4127	Nov. 2	None	V. slight	None	.05	7.9	5.4	.0006	.0054	.0080	.0000	.07	3.9	....	..

Chemical Examination of Water Supplied West Lebanon by Hartford Water Company, White River Junction, Vt.

3804	1906 July 31	None	None	S. veg.	0.1	7.0	4.0	.0018	.0080	.0500	.0000	.15	....	....	..
5493	1908 Aug. 11	M. opal	V. slight	Veg.	0.15	5.8	3.8	.0010	.0080	.0050	.0000	.07	2.6	....	..
5498	Aug. 11	M. opal	V. slight	Veg.	0.17	5.5	3.2	.0010	.0050	.0070	.0000	.06	1.2	....	..

Seventeen private supply analyses were made, showing seven supplies of good quality, three good but for lead, one poor and six polluted waters.

LEE.—No public supply.

LEMPSTER.—No public water supply. Two private supplies examined showed one good but for lead, one of poor quality.

LINCOLN.—The J. E. Henry & Sons Co. introduced a water supply in 1903 directly from a stream. The watershed has an area of several hundred acres, wooded land. It is a gravity system, employing about one half a mile of plain iron main, and also iron service pipes. The entire village is served from this supply. There are no private wells within the area.

Chemical Examination of Water from Faucet of Supply of J. H. Henry & Sons.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
762	1902 Sept. 1	None	V. slight	V.S.veg.	0.1	4.80	1.90	.0000	.0044	.0150	.0000	.05	.3	....	..
1377	1903 July 25	None	None	V. slight	0.05	4.10	1.30	.0000	.0030	.0000	.0000	.04	0.6	....	..
1956	1904 May 14	None	Slight	None	0.2	2.90	1.30	.0000	.0054	.0000	.0000	.05	0.9	....	..
3171	1905 Sept. 14	None	None	None	0.15	3.5	2.0	.0010	.0080	.0100	.0000	.10	0.6	....	..
3426	1906 Jan. 30	None	None	None	0.10	2.5	1.4	.0010	.0034	.0050	.0000	.05	0.4	....	..
4147	Nov. 12	None	None	None	0.05	3.6	1.7	.0006	.0036	.0050	.0000	.07	0.4	....	..
4467	1907 Apr. 25	None	None	None	0.20	2.5	1.3	.0012	.0026	.0110	.0000	.07	0.9	....	..
4488	Oct. 28	V. slight	None	None	0.50	3.0	1.7	.0002	.0070	.0050	.0000	.30	0.4	....	..
5338	1908 June 2	V. slight	V. slight	None	0.12	....	....	.0006	.0014	.0030	.0000	.06	0.4	....	..

LISBON.—The Lisbon Water Works, owned by a private company and installed in 1887, is supplied from a pond fed by springs. The area of the pond is 100 acres; the bottom is gravelly. This is a gravity system, the reservoir having a capacity of 1,000,000 gallons. The mains are of wrought iron, six miles, and the service pipes are the same. About three hundred families, 90 per cent. of the population, are takers. Very few private wells.

Chemical Examination of Water from the Reservoir of the Lisbon Water Works Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
796	1902 Sept. 9	Slight	Consid. floc.	V. slight	0.0	6.90	2.60	.0000	.0066	.0000	.0000	.08	2.3	....	..
1387	1903 Sept. 29	Slight	None	Dec. vg.	0.1	6.70	2.80	.0000	.0120	.0000	.0000	.05	2.7	....	..
1985	1904 May 24	Slight	S. fine	S. musty	0.25	6.10	2.70	.0000	.0030	.0000	.0000	.05	1.9	....	..
2707	1905 Feb. 20	None	Slight	S. veg.	0.10	6.2	4.2	.0000	.0060	.0800	.0000	.15	2.2	....	..
3165	Sept. 14	None	S. fine	Earthy	0.30	5.7	2.6	.0000	.0116	.0100	.0000	.07	2.2	....	*
3442	1906 Feb. 4	None	S. ferrug.	None	0.20	5.2	3.5	.0014	.0058	.0100	.0000	.10	2.1	....	..
4142	Nov. 9	None	None	Slight	0.20	6.0	3.5	.0010	.0104	.0200	.0000	.05	2.2	....	..
4256	1907 Jan. 1	None	Slight	Veg.	0.10	4.5	....	.0030	.0100	.0050	Ft.tr.	.05	3.5	...	*
4268	Jan. 9	..	.....	.....	.....	....	....	.....	.....	.....	.....	....	....	....	*
4290	Jan. 21	Slight	Marked floc.	Veg.	0.20	.....	....	.0044	.0102	.0050	.0000	.05	2.2	....	*
4295	Jan. 25	None	V. slight	Slight	0.10	.....	....	.0044	.0052	.0050	.0000	.07	2.4	....	*
4480	Apr. 29	Sl. opal	Slight	None	0.30	4.6	2.5	.0016	.0016	.0500	.0000	.12	1.6	....	..
4996	Nov. 6	V. slight	V. slight	None	0.35	.....	....	.0040	.0060	.0080	.0000	.16	2.6	....	..
5154	1908 Mar 2	None	None	Earthy	0.20	3.5	2.5	.0010	.0036	.0060	.0000	.10	1.9	....	..
5185	Mar. 24	Mod'ate slight	Consid. earthy	Marked earthy	0.20	4.0	2.5	.0026	.0084	.0040	.0000	.12	1.9	....	..
5316	May 22	Mod'ate	Consid. earthy	Marked earthy	0.20	6.2	4.5	.0012	.0074	.0030	.0000	.08	2.5	....	..

* B. Coli present.

Of the seven private supplies investigated, three were found good three of doubtful character.

LITCHFIELD.—The water supply is from springs and is brought to the houses through lead pipes. There are very few wells in town.

LITTLETON.—The town of Littleton some time ago abandoned the use of Ammonoosuc River as a water supply, and has gone some 10½ miles from the village to a new supply, the north branch of Gale River, the intake of which is at the base of Mt. Garfield. The main pipe, 19 miles long, is 16 inches in diameter for a short distance from the intake; 12 inches for the next five miles; and 10 inches for the remainder of the distance. There are two reservoirs, of 1,000,000 and 500,000 gallons' capacity.

Chemical Analysis of Water from the Littleton Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
1148	1903 Apr. 17	None	S. floc. vg.	None	0.2	2.90	1.00	.0100	.0026	.0200	.0000	.07	0.9	....	a
1149	Apr. 17	None	S. floc. vg.	None	0.15	2.00	0.90	.0000	.0016	.0200	.0000	.05	0.9	....	b
1706	Dec. 2	None	None	None	0.05	3.30	2.10	.0006	.0012	.0400	.0000	.07	0.5	....	..
1707	Dec. 1	None	None	None	0.05	3.10	2.00	.0020	.0012	.0400	.0000	.07	0.5	....	..
1779	1904 Jan. 1	None	V. slight	V. S. vg.	0.05	4.00	2.60	.0000	.0010	.0400	.0000	.15	0.9	....	..
2755	1905 Mar. 16	None	None	None	0.0	5.1	2.5	.0000	.0000	.0300	.0000	.07	0.4	....	..
3423	1906 Jan. 30	None	None	.....	0.0	16.5	8.5	.0024	.0024	.0120	.0000	1.3	5.1	....	c
4141	Nov. 8	None	None	Slight	0.05	3.0	1.5	.0010	.0050	.0200	.0000	.05	0.4	....	*
4231	Dec. 13	None	None	Slight	0.05	3.2	....	.0010	.0026	.0150	.0000	.05	....	....	*
4286	1907 Jan. 17	.....	.....	.....	....	.....	....	.....	.....	.....	.....	....	....	....	†
4287	Jan. 17	.....	.....	.....	....	.....	....	.....	.....	.....	.....	....	....	....	*
4288	Jan. 17	.....	.....	.....	....	.....	....	.....	.....	.....	.....	....	....	....	†
4289	Jan. 17	.....	.....	.....	....	.....	....	.....	.....	.....	.....	....	....	....	*
4469	Apr. 26	None	Slight	None	0.30	5.3	1.6	.0008	.0036	.0100	.0000	.12	0.9	....	..
4911	Oct. 2	Sl. opal	V. slight	Slight	0.30	2.4	1.7	.0020	.0042	.0050	.0000	.05	0.4	....	..
5415	1908 July 9	None	S. fine	None	0.10	2.2	1.3	.0006	.0022	.0060	.0000	.06	0.3	....	..

a South branch of Gale River; *b* North branch of Gale River; *c* Spring in village; * B. Coli present; † B. Coli not present.

The single private supply examined was found of good quality.

LIVERMORE.—The Livermore Mills Company inaugurated a water supply some twenty years ago, the source being both springs, pond and streams. The watershed is about thirty thousand acres in area, and there are 150 persons living thereon. The soil is clay and gravel. The system

is a combination gravity and pump, the latter 150 H. P. Iron pipe is used for the mains.

Chemical Examination of Water from the Livermore Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
5036	1907 Dec. 29	None	Slight	None	0.00	...	.....	.0040	.0054	.0040	.0000	.36	1.9	....	..
5373	1908 June 26	None	V. slight	None	0.10	3.1	2.0	.0008	.0024	.0080	.0000	.07	.4	...	..

Londonderry.—No public supply. Two private supplies were examined, one of these being found in good condition, the other classed as doubtful.

Loudon.—No public supply. Both of the private supplies examined were found to be polluted.

Lyme.—In 1838 the Lyme Aqueduct Company inaugurated a system of water works, the source being springs.

Chemical Examination of Water from Supply of Lyme Aqueduct Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
772	1902 Sept. 3	None	V. slight	None	0.0	8.40	4.70	.0000	.0018	.0250	.0000	.08	4.7	.....	..
1723	1903 Dec. 10	Slight	S. fine	None	0.0	5.40	3.60	.0000	.0022	.0150	.0000	.07	3.1	.0280	..
1975	1904 May 23	None	V. slight	S. foul	0.0	5.50	4.60	.0020	.0020	.0000	.0000	.12	4.5	.....	..
3160	1905 Sept. 12	None	None	S. foul	0.1	7.5	5.3	.0014	.0024	.0100	.0000	.07	4.1	.025	..
3431	1906 Feb. 1	None	V. slight	None	0.0	7.8	5.7	.0020	.0040	.0100	.0000	.15	3.9	.....	..
4150	Nov. 13	None	None	None	0.00	7.2	6 2	.0008	.0044	.0050	.0000	.10	4.6	.....	..
4586	1907 May 30	None	V. slight	None	0.00	6.8	5.3	.0004	.0022	.0050	.0000	.11	3.9	.....	..
5007	Nov. 11	None	None	None	0.00	6.8	6.1	.0018	.0024	.0040	.0000	.19	3.9	.....	..
5323	1908 May 26	V. ft. op.	V. S. fibr.	Marked stale	0.00	6 9	5.1	.0010	.0006	.0050	.0000	.10	3.9	.....	*

* B. Coli present.

LYNDEBOROUGH.—No public supply. Six samples from private supplies were examined, showing three good but for lead content, two of doubtful character and one polluted.

MADBURY.—No public supply. The two private supplies examined were found to be of poor quality.

MADISON.—The John F. Chick private water supply was installed in 1905. The source is a spring, excavated two or three feet deep, and the water flows by gravity through about one mile of galvanized iron pipe, both main and service. About fifteen families take this water. There are some private wells within the area.

Chemical Examination of Water from John F. Chick Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
	1908														
5496	Aug. 11	None	None	None	0.00	4.9	3.0	.0008	.0006	.0150	.0000	.07	2.6	....	..
5497	Aug. 11	None	None	None	0.05	3.3	2.0	.0005	.0000	.0150	.0000	.07	.9	....	..

Three private supplies were found of good quality, a fourth being in poor condition.

MANCHESTER.—A water supply was instituted by the city in 1873, was added to in 1886, and supplemented by a high service in 1894. The source is Lake Massabesic, having an area of 2,500 acres, an average depth of 20 feet, and a bottom partly rocky and partly muddy. It has approximately 40 miles of watershed, wooded and cleared about equally. Some sawdust enters the lake. The water is pumped to a reservoir of 15,000,000 gallons' capacity, and an average depth of 20 feet. Low service by gravity; high service by steam; 4,000,000-gallon reservoir. There are 110 miles of distributing mains, iron; service pipes are iron, lead lined. The average daily consumption is 3,500,000 gallons; 13,000 families, 99 per cent. of the population, are consumers of this water. There are not many individual wells within the radius of this supply.

Chemical Examination of Water from Lake Massabesic.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
	1902														
369	Jan. 21	None	None	Dec. vg.	0.8	5.70	1.20	.0054	.0204	.0000	.0000	.12	0.7	....	*f*
370	Jan. 21	None	None	Dec. vg.	0.7	5.50	.70	.0044	.0228	.0000	.0000	.16	0.7	....	†
371	Jan. 21	None	None	Dec. vg.	0.7	5.70	1.00	.0020	.0188	.0000	.0000	.21	0.7	....	‡
372	Jan. 21	None	None	Dec. vg.	1.0	9.10	1.60	.0012	.0156	.0000	.0000	.17	0.7	....	..
727	Aug. 22	None	Floc. veg.	Veg.	0.35	7.40	1.30	.0000	.0106	.0000	.0000	.17	1.2	....	¶
	1903														
1074	Mar. 5	Slight	Fine floc. veg.	Dec. vg.	0.1	3.80	1.00	.0010	.0132	.0040	.0000	.10	0.0	....	‡
1075	Mar. 5	Slight	Fine floc. veg.	Dec. vg.	0.7	4.90	1.10	.0000	.0066	.0040	.0000	.11	1.0	....	§
1076	Mar. 5	Slight	Fine floc. veg.	V. dec. vg.	0.75	6.50	1.30	.0000	.0066	.0040	.0000	.15	1.2	...	†
1077	Mar. 5	Slight	Fine floc. veg.	Dec. vg.	0.65	4.80	1.60	.0000	.0066	.0040	.0000	.17	1.4	....	††
	1904														
2491	Oct. 26	Slight	M. fine	Dec. vg.	0.4	3.5	1.7	.0000	.0060	.0050	.0000	.22	0.4	....	*a*
2492	Oct. 26	Slight	M. fine	S. veg.	0.25	3.7	2.3	.0000	.0072	.0050	.0000	.15	0.4	....	*
2493	Oct. 28	Slight	S. fine	Dec. vg.	0.30	3.7	2.7	.0000	.0060	.0050	.0000	.17	0.4	....	†
2494	Oct. 28	V. slight	M. fine	S. veg.	0.35	4.0	1.9	.0000	.0060	.0050	.0000	.15	0.4	...	§
2495	Oct. 28	Slight	M. fine	S. veg.	0.30	3.1	2.0	.0000	.0060	.0050	.0000	.15	0.4	....	*b*
	1905														
3177	Sept. 19	None	None	Arom.	0.20	4.5	1.7	.0006	.0104	.0100	.0000	.20	0.6	....	*
3214	Oct. 4	None	S. fine	Veg.	0.40	3.7	0.8	.0008	.0100	.0050	.0000	.27	0.6	....	*c*
3215	Oct. 4	S. fine	S. fine	S. veg.	0.20	4.5	1.8	.0008	.0092	.0050	.0000	.27	0.7	....	*d*
3216	Oct. 4	S. fine	S. fine	Veg.	0.30	5.4	2.4	.0008	.0100	.0050	.0000	.30	0.6	....	†
3217	Oct. 4	None	S. fine	S. veg.	0.20	5.2	2.5	.0008	.0106	.0050	.0000	.30	0.7	....	*
3218	Oct. 4	Slight	Slight	Veg.	0.20	4.0	1.9	.0008	.0084	.0050	.0000	.25	0.7	....	*e*
3219	Oct. 4	None	Slight	Veg.	0.55	6.9	2.2	.0030	.0084	.0050	.0000	.22	1.1	....	§
	1907														
4949	Oct. 15	None	S. earthy	None	0.35	4.2	2.0	.0002	.0102	.0040	.0000	.20	0.4	....	*g*
4950	Oct. 15	None	S. earthy	Argillac.	0.35	3.7	1.7	.0008	.0084	.0060	.0000	.18	0.4	....	*h*
4951	Oct. 15	None	S. earthy	Argillac.	0.35	4.7	3.0	.0010	.0084	.0020	.0000	.20	1.2	....	*f*
4952	Oct. 15	None	S. earthy	None	0.35	4.5	1.7	.0002	.0084	.0006	.0000	.23	0.4	....	*j*
4953	Oct. 15	None	Slight	None	0.30	3.0	1.5	.0002	.0078	.0100	.0000	.19	0.4	...	*c*
4954	Oct. 15	V. slight	S. earthy	None	0.35	4.8	1.7	.0010	.0084	.0100	.0000	.22	0.4	....	*k*
4955	Oct. 15	None	S. earthy	None	0.40	4.6	1.8	.0016	.0078	.0080	.0000	.21	0.4	....	*l*
4956	Oct. 15	V. S. op.	S. earthy	None	0.30	4.3	1.7	.0012	.0104	.0100	.0000	.23	0.4	....	§
	1908														
5165	Mar. 11	None	V. slight	S. earthy	0.50	.....	....	.0018	.0100	.0100	.0000	.34	0.4	...	*

f Sample taken at high service intake; † Sample aken at Deer Neck Bridge, Auburn; ‡ Sample taken halfway between Severance Beach and Battery Point; § Sample taken at mouth of Sucker Brook; ¶ Sample taken at tap in Board of Health Building from low service reservoir; †† Sample taken in front of Judge Emery's house in Auburn; *a* Taken between Battery and Rocky points; *b* Island toward low service intake; * B. Coli present; *c* Battery Point; *d* Bog, north end of Back Pond; *e* Dam at outlet; *g* Under bridge; *h* Low service outlet; *j* Between Brown and Fletcher islands; *k* Mouth of Merrill Brook; *l* From of big wharf.

Chemical Examination of Water from the Piscataquog River.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
5491	1908 Aug. 10	Slight	Mod. floc.	Earthy	0.50	5.5	2.0	.0086	High	.0050	Tr.	.10	1.0	...	..
5492	Aug. 10	Slight	Moderate	Mod. earthy	0.60	6.4	3.2	.0094	High	.0080	Tr.	.20	1.0	...	..

Chemical Analysis of Water from Various Supplies of State Industrial School, Manchester.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammon ia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
498	1902 May 5	None	None	None	0.0	9.70	5.60	.0026	.0084	.0800	.0000	.40	2.0	....	*
499	May 5	Slight	None	S. veg.	0.0	7.60	4.50	.0000	.0026	.2500	.0000	.70	1.95	....	†
500	May 5	Marked	None	Marked stable	0.3	7.80	2.10	.0036	.0148	.0700	.0000	.40	1.6	....	‡
1909	1904 Apr. 27	None	Slight	V. slight	0.05	7.10	5.60	.0052	.0096	.0800	.0003	.80	1.1	....	§
1910	Apr. 27	None	None	Slight	0.0	6.90	3.90	.0040	.0042	.1000	.0002	.60	3.2	....	§§
1911	Apr. 27	None	None	Slight	0.05	5.10	2.50	.0000	.0052	.0050	.0000	.25	2.2	....	††
1912	Apr. 27	None	Slight	Slight	0.0	9.30	6.60	.0014	.0026	.4000	.0003	.70	3.1	....	**
1913	Apr. 27	None	Slight	Slight	0.0	6.10	2.90	.0026	.0032	.0500	.0004	.35	2.4	....	¶

* Bricked up spring west of pond.
† Tank in top of main building fed by spring well near Union Street.
‡ Pond north of horse barn, while pond was turbid after heavy rains.
§ South horse spring.
§§ North cow spring.
†† Big north well.
** Big south well.
¶ Spring near red barn; B. Coli present.

Chemical Analysis of Water from the Derryfield Spring, Manchester.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
4607	1907 June 10	None	None	None	0.00	.....	....	.0014	.0008	.0200	.0000	.25	1.9	....	..

Chemical Analyses of Water from Well of Peoples' Gas Light Company, Manchester, Used by Employees for Drinking Purposes.

4612	1907 June 12	None	None	None	0.00	.....	....	.0016	.0008	.3000	.0011	1.05	5.3	....	..
5426	1908 July 14	None	V. slight	S.earthy	0.05	... .	....	.0010	.0012	.2000	trace	1.03	4.6	....	..

Sixteen samples representing private supplies were received, classified as three of good quality, two good but for dissolved lead, four of doubtful quality, and seven polluted.

Marlborough.—Water is from private springs, average about three feet deep, and flows by gravity through one-inch lead pipe to dwellings.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
2407	1904 Oct. 3	Slight	Con. floc.	Musty	0.05	10.6	3.1	.0000	.0000	.0000	.0000	.15	0.3	....	...
2408	Oct. 3	None	M. fine	Musty	0.10	15.7	8.1	.0000	.0000	.0000	.0000	.15	0.4	....	...
2669	1905 Jan. 30	None	Much	None	0.0	4.1	2.1	.0000	.0000	.0100	.0000	.15	0.4	0.056	...
3647	1906 May 29	None	None	Slight	0.10	2.0	1.0	.0020	.0024	.0100	.0000	.07	....	....	...
4553	1907 May 19	None	None	Sl. veg.	0.00	2.9	1.9	.0008	.0016	.0100	.0000	.22	0.9	....	...
4999	Nov. 4	None	None	None	0.5	.....	...	.0002	.0064	.0020	.0000	.17	1.2	....	...

Of the fourteen samples representing private supplies four were of good quality, nine good but for dissolved lead, and one was polluted.

Marlow.—All use wells or spring water.

Mason. No public supply.

Meredith—The Meredith Fire District owns and operates a water supply that was installed in 1894, the source being springs. The water flows by gravity from a reservoir on a hill, 175 feet above the level of the town. The iron main is 4¾ miles long; the service pipes are of galvanized iron. Two hundred families, 85 per cent. of the population, are supplied. There are two public drinking fountains on this system.

Chemical Examination of Water from a Faucet of the Supply of the Meredith Fire District.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
	1902														
774	Sept. 3	None	None	Dec. vg.	0.2	6.10	1.60	.0020	.0074	.0000	.0000	.12	1.6	.....	..
	1903														
1296	July 7	Slight	V. slight	M. veg.	0.1	5.00	2.30	.0000	.0038	.0000	.0000	.10	1.6	.....	..
1399	Aug. 3	Marked	M. fine	V. dec. veg.	0.25	6.60	1.90	.0040	.0158	.0300	.0000	.15	1.9	.....	..
	1904														
1971	May 23	None	None	S. veg.	0.25	3.10	1.70	.0022	.0030	.0000	.0000	.15	1.6	.....	..
	1905														
2688	Feb. 9	None	None	V. slight	0.10	6.0	3.3	.0010	.0000	.0100	.0000	.20	1.8	.....	..
3193	Sept. 25	V. slight	None	Slight	0.20	4.2	2.6	.0010	.0082	.0100	.0000	.10	1.5	.....	..
	1906														
3427	Jan. 30	None	None	Slight	0.10	4.9	2.6	.0008	.0024	.0050	.0000	.22	1.2	trace	..
4175	Nov. 21	None	None	V. sl. foul	0.05	4.8	2.3	.0014	.0076	.0100	.0000	.22	1.9	.....	..
	1907														
4513	May 8	None	V. slight	None	0.10	2.6	1.8	.0012	.0030	.0050	.0000	.17	0.4	.03	..
5013	Nov. 12	V. slight	V. slight	None	0.25	2.9	1.8	.0002	.0054	.0050	.0000	.32	1.2	.....	..

Five samples received from private sources represented one supply of good quality, two doubtful and two polluted supplies.

Merrimac.—No public supply. Three private supplies were found in poor condition and one supply was reported as polluted.

Middleton.—No public supply. This is a farming town and each place has its individual well.

Milan.—No public supply. One private supply was found to be contaminated with lead.

MILFORD.—The public water works of Milford were built in 1890 by John T. Langford and purchased by the town in 1891. There are three collecting wells, two of them about 35 feet in diameter and one 20 feet deep; one somewhat smaller is fed by driven pipes. Soil, gravel with clay bottom. The water is pumped to a stand pipe of 250,000 gallons' capacity.

Chemical Examination of Water from Faucet of Milford Water Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
152	1901 Sept. 9	None	None	None	0.2	5.10	3.20	.0012	0074	.0120	.0000	.23	....	...	..
826	1902 Sept. 22	None	None	None	0.1	6.40	3.60	.0000	.0030	.0000	.0000	.13	3.40	...	..
827	Sept. 22	V. slight	Slight	Slight	0.3	8.00	2.60	.0022	.0066	.0000	.0003	.18	2.60	....	..
1014	1903 Jan. 28	Slight	None	Veg.	0.1	13.60	4.00	.0000	.0008	.0000	.0000	.17	3.30	....	..
1400	Aug. 3	V. slight	None	None	0.1	5.60	2.80	.0000	.0040	.0000	.0000	.15	2.40	....	..
1980	1904 May 23	None	None	S. earthy	0.15	5.90	1.40	.0000	.0018	.0000	.0000	.10	1.20	....	*
2080	June 21	Slight	V. marked floc. red	V. slight	0.3	6.60	4.60	.0006	.0010	.0000	.0000	.22	4.70	....	..
2147	July 12	None	V. slight	V. slight	0.3	4.40	1.10	.0026	.0044	.0000	0000	.20	0.90	....	a
2148	July 12	Marked	V. slight	None	0.1	6.60	2.20	.0014	.0034	.0000	.0000	.17	2.30	....	b
2206	July 26	V. slight	V. slight	V. slight	0 3	3.70	2.40	.0000	.0060	.0000	.0000	.12	1.80	....	c
2208	July 26	None	None	None	0.0	4.90	3.50	.0006	.0000	.0200	.0000	.17	1.10	....	a
2368	Sept. 14	Slight	Slight	V. slight	0.15	4.90	2.90	.0000	.0064	.0000	.0000	.20	1.90	....	d
2369	Sept. 14	Slight	Slight	None	0.3	6.10	2.50	.0000	.0070	.0000	.0000	.15	2.70	....	c
2370	Sept. 15	None	Con. floc.	Dec. earthy	0.05	5.20	2.40	.0010	.0024	.0000	.0000	.20	2.60	....	b
3163	1905 Sept. 12	V. slight	Slight	None	0.20	7.3	4.4	.0000	.0104	.0100	.0000	.17	2.9	....	c
3164	Sept. 12	V. slight	None	None	0 20	5.5	2.8	.0006	.0054	.0050	.0000	.20	2.3	...	..
3419	1906 Jan. 30	None	Slight	None	0.10	4.4	2.5	.0006	.0020	.0050	.0000	.20	2.2	....	c
3759	July 17	None	None	None	0.15	5.8	3.3	.0006	.0020	.0100	.0000	.20	1.6	....	..
4068	Oct. 22	V. slight	V. slight	V. sl. veg.	0.10	4.8	2.8	.0010	.0024	.0050	.0000	.07	1.2	....	..
4215	1907 Jan. 30	None	V. slight	None	0.00	....	....	.0010	.0022	.0050	.0000	.21	1.2	....	*
4358	Mar. 6	None	None	Foreign	0.15	.....	....	.....	.....	.0050	.0000	.20	0.9	....	..
5009	Nov. 11	None	None	None	0.10	4.6	3.0	.0002	.0040	.0050	.0000	.31	1.9	....	..
5207	1908 May 20	None	None	None	0.10	5.8	2.3	.0002	.0024	.0050	.0000	.12	0.9	....	..

* B. Coli present; a well No. 1; b well No. 2; c well No. 3; d standpipe; e tap at pumping station.

Of 25 samples received from private sources eight were found to represent water of good quality, six good except for lead contamination, seven doubtful and four polluted.

MILTON.—This town (two villages) is dependent for its water supply upon private wells. The land is shallow, with ledge rarely more than a few feet from the surface. The single private supply examined was found of good quality.

MONROE.—People have their private water supplies, mostly from springs.

MONT VERNON.—No public supply. The seven private supplies examined included one of good quality, one good but for lead, three doubtful and two polluted.

MOULTONBOROUGH.—No public supply. One private supply examined was found of good quality.

NASHUA.—A private supply, the Pennichuck Water Works, installed by Nashua Aqueduct Company, in 1853, has for a source springs and wells. The wells, from 16 to 52 feet in depth, are driven through alternate layers of marl, sand, fine gravel and coarse gravel, and flow from 20 gallons to 275 gallons per minute. The reservoir, of 4,000,000 gallons' capacity, is 13 feet in depth. There are about 75 miles of cast-iron distributing mains; wrought iron, galvanized, is used for service pipes. The average daily consumption is 3,500,000 gallons, by 4,000 families, about 95 per cent. of the population.

One private supply was examined and found good.

Chemical Examination of Water from Pennichuck Water Works Company, Nashua.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
	1902														
750	Aug. 26	None	None	S. veg.	0.0	6.00	1.50	.0000	.0000	.0000	.0000	.15	1.5	....	..
1136	Apr. 12	None	Floc. veg.	S. veg.	0.0	4.00	2.70	.0000	.0010	.0150	.0000	.17	2.0	....	..
1137	Apr. 12	None	None	None	0.0	3.80	2.20	.0000	.0000	.0000	.0000	.15	2.4	....	..
1395	July 3	Slight	Floc. veg.	V. dec. veg.	0.08	4.30	2.30	.0000	.0048	.0000	.0000	.20	2.2	....	..
1396	July 3	Slight	Floc. veg.	V. dec. veg.	0.08	5.20	2.50	.0000	.0024	.0000	.0000	.20	2.2	....	..
	1904														
1978	May 23	V. mark.	S. fine	S. musty	0.6	4.10	1.10	.0000	.0024	.0350	.0000	.22	0.9	....	..
2384	Sept.19	Slight	Con. fine	V. dec. veg.	0.2	4.40	2.70	.0000	.0024	.0000	.0000	.20	1.4	....	..
2500	Oct. 31	None	S. fine	V. slight	0.0	5.7	4.0	.0000	.0020	.0000	.0000	.20	2.6	....	..
	1905														
2682	Feb. 6	None	None	Earthy	0.1	4.2	1.9	.0000	.0000	.0100	.0000	.17	1.8	....	..
3180	Sept.19	Slight	None	Veg.	0.15	6.3	2.8	.0034	.0082	.0050	.0000	.17	1.9	....	..
	1906														
3445	Feb. 6	None	None	Veg.	0.10	3.7	2.7	.0008	.0030	.0050	.0000	.22	2.0	....	..
3820	Aug. 7	V. slight	V. slight	Veg.	0.03	6.0	5.0	.0010	.0064	.0050	.0000	.20	1.4	....	..
4178	Nov. 23	None	None	Earthy	0.05	5.0	4.0	.0010	.0054	.0050	.0000	.25	0.19	...	..
	1907														
4294	Jan. 24	None	None	None	0.00	.....	....	.0010	.0006	.0000	.0000	.07	2.7	....	..
5025	Nov. 15	None	None	Earthy	0.10	3.9	3.3	.0008	.0024	.0020	.0000	2.3	1.9	....	..
	1908														
5117	Jan. 21	None	None	None	0.00	3.3	2.7	.0008	.0008	.0060	.0000	.21	2.5	....	..

Chemical Examination of Water from Danforth Spring.—Supply of Highland Sanitarium.

	1907														
4374	Mar. 18	None	V. slight	Sl. foul.	0.00	9.8	7.8	.0046	.0020	.3700	trace	.68	3.6	....	*
	1908														
5118	Jan. 21	None	None	None	0.00	6.8	4.0	.0012	.0016	.0200	.0000	.65	3.2	....	..
5119	Jan. 21	None	None	None	0.05	6.8	4.4	.0006	.0012	.0150	.0000	.64	3.2	....	

* B. Coli present.

Chemical Examination of Water from Harris Pond.

	1908														
5116	Jan. 21	None	None	Hay like	0.50	2.0	1.7	.0004	.0054	.0100	.0000	.19	1.2	....	*

* Colon B. present.

Chemical Examination of Water from Nashua River.

Number.	Date of collection.	Appearance			Color.	Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.		Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
4298	1907 Jan. 24	Mod. opal	Moderate	Musty	0.80	.....	.....	.0240	.0120	.0000	.0000	.60	2.6	.....	*

* Colon B. present.

Seven samples representing private supplies, included three of good quality, one good but for lead, two in poor condition and one polluted.

Nelson.—No public supply. Two samples from private sources representing good water were received, a third being found lead contaminated.

New Boston. The New Boston Creamery furnishes water from Grist Mill Pond; the latter is of small area and hard bottom. The water flows by gravity through eight-inch pipe from pond forced through pump, eight-foot head. This water is furnished for fire hydrants, and to eight families, but is not used for drinking or in food. Drinking water is from wells and springs.

Chemical Examination of Water from Grist Mill Pond.

Number.	Date of collection.	Appearance			Color.	Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.		Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
4506	1907 May 6	None	V. slight	None	1.60	5.4	2.4	.0014	.0090	.0150	.0000	.28	0.9	present	..
5020	Nov. 19	None	None	None	0.80	3.9	2.7	.0004	.0104	.0050	.0000	.28	0.4	high	..

Of the three samples representing private supplies two were found to be lead polluted, the third of poor character.

NEWBURY.—Private parties supply running water from springs to the summer cottages at Blodgett's Landing. Another party supplies his own and two or three other cottages from a well.

Chemical Examination of Water from Spring of G. W. Blodgett, Blodgett's Landing.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
4520	1907 May 10	None	None	None	0.00	5.3	4.3	.0018	.0018	.0200	.0000	.49	2.3	....	..

Four samples received from private sources were found to be organically pure, though two showed an excess of lead.

NEWCASTLE.—The water supply is from wells and cisterns. The Portsmouth Water Works runs water to the forts, and two or three summer cottages are connected with it.

The single private supply examined was found to be polluted.

NEW DURHAM.—The water supply is from springs or wells, mostly from dug wells, but some are bored. There are some private wells by the roadside, and facilities for drinking are furnished to man and beast.

NEWFIELDS.—No public supply.

NEW HAMPTON.—The introduction of a public supply is under consideration by the town at the present time. Investigation has been made regarding the suitability for this purpose of three different ponds and one of these has now practically been selected. (See report of Professor Fletcher elsewhere.) The source in view consists of a mountain pond located at a considerable altitude above the village and remote from any danger of contamination. While the chemical analyses of this water have been very favorable, the latter seems to contain quite a good deal of microscopic life, one species of crustaceæ (diaptomus) being conspicuous. Whether the presence of such is liable to be permanent with the supply in use is somewhat problematical. The opinion of those who have encountered this form of life in the water supplies of other states seems to be that the presence of such has no determinable sanitary or hygienic significance.

Chemical Examination of Water from Mountain Pond, Proposed Public Supply.

Number.	Date of collection.	Appearance.				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
5277	1908 May 4	Slight	S. floc.	S. stale	0.15	3.5	1.9	.0016	.0044	.0030	.0000	.09	0.4	....	..
5278	May 4	Mod'ate	S. floc.	Slight	0.10	2.4	1.2	.0018	.0066	.0050	.0000	.09	0.4	...	..
5297	May 18	V. slight	S. floc.	None	0.15	2.5	1.3	.0006	.0024	.0050	.0000	.08	0.3	....	..
5495	Aug. 12	V. slight	V. slight	None	0.20	.....	....	.0005	.0113	.0050	.0000	....	....	....	..

Chemical Examination of Water from Pond Designated No. 1.

5227	1908 Apr. 14	None	S. floc.	V. slight	0.10	2.2	1.2	.0008	.0030	.0060	.0000	.08	0.4	....	..

Chemical Examination of Water from Pond Designated No. 2.

5228	1908 Apr. 14	V. slight	V. slight	S. veg.	0.20	3.5	1.7	.0020	.0106	.0050	.0000	.08	1.2	....	..
5254	Apr. 27	None	S. fibrous	S. musty	0.20	2.6	1.0	.0020	.0064	.0070	.0000	.11	0.3	...	..

Eight samples representing private sources were all found organically pure, though six showed the presence of dissolved lead.

Newington.—No public supply.

New Ipswich.—There is one spring in town, or it might be termed a well, from which three families get water through a ¾-inch lead pipe. The well is in a pasture, 60 rods from the buildings, and is dug about seven feet deep.

One fountain at the center of the town, for both man and beast, is supplied by a well about six or eight feet deep and about thirty rods distant, the water flowing through a lead pipe.

Chemical Examination of Water from Well at School No. 1, Smithville.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
4515	1907 May 7	None	V. slight	None	0.00	.....	....	.0014	.0014	.0400	.0004	1.16	3.6	....	..

The single private supply investigated was found to be polluted.

NEW LONDON.—A few families are furnished water from a private supply installed in 1904, the source being a well bored to a depth of 200 feet in clay soil. Recently the matter of a public supply system has received some consideration, and in this connection preliminary analyses have been made of the water of Morgan Pond, located in the town of Springfield.

Chemical Examination of Water from Morgan Pond.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
3931	1906 Aug. 28	None	S. veg.	S. veg.	0.50	5.0	2.2	.0026	.0134	.0000	.0000	.05	0.7	.....	...
3932	Aug. 28	None	S. veg.	S. veg.	0.60	6.0	2.8	.0390	.0170	.0000	.0000	.10	0.9	.....	*a

* B. Coli present. a Brook flowing from Morgan Pond.

Chemical Examination of Water from Stream on land of H. W. Kidder.—Twin Lake Village Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
4839	1907 Aug. 26	None	None	None	0.8	....	....	.0002	.0052	.0050	.0060	.10	1.9	.....	..

Chemical Examination of Water from Wells of Soo-Nipi Park Company.

5047	1907 Dec. 2	None	None	None	0.00	.....	....	.0014	.0026	.0080	.0000	1.93	6.7	high	..
5056	Dec. 2	Sl. opal	V. slight	None	0.20	.....	....	.0040	.0038	.0100	V. high	2.29	4.6	.....	..

One private supply was found to carry an excess of lead, and one other polluted.

NEWMARKET.—The public water supply, owned by the town, was built in 1894. The water, from springs, is pumped to a standpipe of 22,000

gallons' capacity. There are seven miles of cast-iron distributing mains, and the service pipes are of galvanized iron. The average daily consumption is 150,000 gallons. About 90 per cent. of the population are supplied from this system, but some private wells are still in use. The two well supplies examined were badly polluted. One spring water was of good quality.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
2952	1905 July 3	None	Clayey	Earthy	0.35	7.1	5.8	.0000	.0042	.0000	.0000	.30	2.8	....	*
3444	1906 Feb. 6	S. opal	None	None	0.10	7.7	5.2	.0006	.0028	.0100	.0000	.35	1.9	....	..
4678	1907 July 3	S. opal	V. slight	None	0.35	6.3	4.3	.0010	.0074	.0150	.0000	.28	2.9	....	*
4916	Oct. 2	Mod. opal	V. slight	S. earthy	0.60	6.4	3.6	.0002	.0100	.0050	.0000	.37	1.9	....	..

* B. Coli present.

Five samples representing private sources were all found to be polluted.

Newport.—The town owns and operates a system of water works, installed in 1894, supplied by a pond, or lake, of 66 acres; average depth about thirty feet; bottom largely sand and rock. The watershed is about four or five square miles, about two thirds wooded; three families reside thereon. There are also one or two individuals who sell spring water.

The public supply is a gravity system, with eight miles of cast-iron mains, and wrought-iron, cement-lined service pipes. Perhaps five hundred families take this water. There are not many private wells.

Chemical Examination of Water from Tap of Town Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
844	1902 Oct. 9	None	None	Veg.	0.1	6.90	1.20	.0000	.0048	.0000	.0004	.10	.9	....	..
2013	1904 June 2	None	None	S. musty	0.1	4.10	2.50	.0000	.0036	.0000	.0000	.15	1.6	....	..
3448	1906 Feb. 6	V. slight	V. slight	S. veg.	0.1	2.8	1.4	.0026	.0070	.0050	.0000	.12	0.4	..	..
4225	Dec. 10	Mod. opal	Slight	Slight	0.1	5.0	2.5	.0008	.0092	.0050	.0000	.08	....	....	..
4516	1907 May 8	None	V. slight	None	0.10	3.4	2.5	.0024	.0046	.0050	.0000	.13	0.9	....	..
5065	Dec. 6	None	None	None	0.20	4.2	2.7	.0012	.0074	.0120	.0000	.05	.04	....	..

Twenty-two samples from private sources were received, classified as seven good, nine good but for lead, five of poor quality and one polluted.

NEWTON.—All the water used in this town is from private wells, and many of them are dry during a time of drought. Seven private supplies investigated included three of good quality, three poor water and one polluted.

NORTHFIELD.—The Tilton & Northfield Aqueduct Company's works were built in 1887–'88. The source is Chestnut Pond, of 60 acres area, 10 to 76 feet deep, sandy or gravelly bottom. Several hundred acres of the watershed are pasture and woodland; five farms. This is a gravity system, with 12 miles of cement-lined and cast-iron mains, with galvanized iron service pipes. Probably 500 families take this water, 80 or 90 per cent. of the population. Very few private wells.

Chemical Examination of Water from a Faucet of the Tilton & Northfield Aqueduct Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
	1901														
11	May 28	V. slight	Slight	Distinct veg.	0.2	3.40	1.30	.0019	.0150	.0000	.0000	.09	....	...	..
345	Dec. 31	None	None	None	0.2	2.90	1.20	.0044	.0136	.0050	.0000	.09	0.9	....	..
	1903														
1219	June 1	Marked	Much flocred	V. slight	0.2	4.60	2.00	.0000	.0100	.0000	.0000	.10	1.1	....	..
1431	Aug. 11	Slight	None	V. slight	0.15	3.00	1.00	.0000	.0074	.0000	.0000	.09	0.4	....	..
1636	Nov. 2	None	None	None	0.0	2.80	1.30	.0000	.0050	.0000	.0000	.20	1.2	....	..
	1904														
2022	June 7	Slight	Much fine	V. slight	0.3	4.40	2.20	.0000	.0098	.0000	.0000	.10	1.9	....	..
	1905														
2712	Feb. 21	Slight	V. slight	Slight	0.10	3.9	2.5	.0000	.0010	.0150	.0000	.15	0.6	....	..
2785	Apr. 3	None	None	Dec.veg.	0.30	8.5	6.5	.0000	.0044	.0100	.0000	.15	0.6	....	..
	1906														
3482	Feb. 22	V. slight	None	S.earthy	0.20	2.0	1.0	.0010	.0084	.0050	.0000	.17	0.9	....	..
	1907														
4533	May 14	V. slight	S. veg.	S. veg.	0.30	3.5	2.0	0054	.0166	.0050	.0000	.25	1.2	....	..
5082	Dec. 16	Slight	V. slight	None	0.20	3.2	1.7	.0012	.0042	.0100	.0000	.23	0.4	....	..

NORTHUMBERLAND.—Groveton Village Precinct incorporated a system of public water works in 1894, from streams. There are two watersheds, of wooded land mainly, with no inhabitants. The source of the supply is in the mountain-side, and the water flows by gravity through about four miles of cast-iron mains; service pipes are of galvanized iron. The entire precinct is supplied from this system. There are two or three private wells within the radius of this supply.

Northumberland Falls is supplied by a private water company.

Chemical Analysis of Water from Groveton Village Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
4204	1906 Nov. 30	None	V. slight	S.earthy	0.10	4.0	2.5	.0008	.0054	.0050	.0000	.15	1.2	....	*
4532	1907 May 13	None	None	None	0.10	2.3	1.5	.0004	.0046	.0100	.0000	.14	0.7	....	..
5068	Dec. 9	None	None	None	0.00	2.7	1.4	.0008	.0032	.0200	.0000	.09	0.4	....	..

* B. Coli present.

One private source investigated was found to be polluted.

North Hampton—No public supply. Residents of Little Boar's Head and vicinity are furnished with water supplied by the Hampton Water Company (see Hampton). Nine samples from private supplies showed two good, five poor condition and two polluted.

Northwood.—No public supply. One private source was found of inferior quality.

Nottingham.—All get water from wells and springs.

Chemical Examination of Water from Well Used by General Public at Nottingham.

Number.	Date of collection.	Appearance.				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
3020	1905 July 26	None	V. Slight	None	0.0	5.7	3.5	.0008	.0022	.0200	.0000	.27	1.4	...	..

ORANGE.—The supply is wholly from private wells and springs.

ORFORD.—No public supply. There are private supplies from springs, which furnish water to some 30 families. These springs are dug from six to eight feet deep, through sandy loam, subsoil rock. The water flows by gravity through iron and lead mains, with lead for service pipes. There are no individual wells in the vicinity. There are several other private springs.

Chemical Examination of Water from the Wilcox Springs.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
766	1902 Sept. 2	V. slight	Sl. floc.	None	0.0	5.60	4.30	.0000	.0000	.0000	.0000	.05	3.2	....	..

One private supply investigated proved of doubtful quality.

OSSIPEE.—The entire supply is from wells and springs. Three samples from private sources were found to represent good water, while a fourth was found to be polluted.

PELHAM. The water supply is wholly from private wells, varying in depth from 12 to 40 feet.

PEMBROKE.—There are two private supplies. The Suncook Water Works, built in 1896, is supplied from a pond having an area of 25 acres, and located eight miles from the village; no inhabitants within two or three miles. The water, which flows by gravity, is taken from a collecting reservoir, located five miles from town and formed by the damming of a brook flowing from the pond. The area flowed has become swamp-like in character, none of the surface growth having been removed, and as a result, this supply is the most highly colored in the state. There are 9 miles of distributing mains, cast iron; service pipes of galvanized iron. About 50 per cent. of the population are supplied from this source. The Baker & Dearborn Water Works were built in 1895, the source being a spring and Suncook River. The latter receives all the sewage of Pittsfield, 16 miles above. The river water is pumped to three reservoirs, 150 x 20, 50 x 20, and 50 x 20, and nine feet deep respectively. The distributing main is one mile in length and is of wrought iron; service pipes of galvanized iron. About 10 per cent. of the population take from this supply.

Chemical Examination of Water from Suncook Water Works.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
	1903														
1331	July 14	None	Floc. veg.	S. veg.	1.5	6.10	0.90	.0028	.0248	.0000	.0000	.15	0.6	....	..
1563	Oct. 12	None	None	S. veg.	0.7	5.90	1.00	.0000	.0126	.0000	.0000	.17	0.6	....	..
	1904														
1982	May 8	None	None	Marked veg.	0.85	2.00	0.40	.0020	.0102	.0000	.0000	.12	0.4	....	..
	1905														
2658	Jan. 23	None	None	Veg.	1.2	8.0	2.1	.0000	.0134	.0200	.0000	.20	1.9	....	..
2729	Feb. 27	None	None	Slight	0.7	5.8	2.6	.0104	.0046	.0000	.0000	.27	1.5	....	..
2961	July 6	None	Con. floc.	S. veg.	1.6	5.5	1.7	.0000	.0104	.0000	.0000	.12	1.2	....	..
3278	Oct. 31	None	None	Arom'tic	1.2	6.7	2.7	.0028	.0186	.0050	.0000	.22	1.5	....	..
	1906														
3840	Aug. 14	V. slight	Moderate	None	1.2	4.5	2.0	.0044	.0190	.0100	.0000	.07	...	....	*
4164	Nov. 16	V. slight	V. slight	S. veg.	0.60	5.0	3.5	.0024	.0064	.0050	.0000	.10	1.2	....	..
4399	Apr. 4	None	None	S. veg.	0.80	2.8	1.1	.0016	.0076	.0800	.0000	.14	1.0	....	..
4895	Oct. 25	None	None	S. veg.	1.40	7.2	2.6	.0002	.0300	.0000	.0000	.06	0.4	....	..
	1908														
5166	Mar. 13	V. faint	V. slight	None	0.60	3.3	1.7	.0006	.0090	.0120	.0000	.20	1.2	....	..
5539	Aug. 18	None	None	Swampy	1.60	8.3	1.8	.0012	High	.0080	.0000	.16	1.1	....	*

* B. Coli present.

Chemical Examination of Water from Baker and Dearborn Supply.

	1903														
1584	Oct. 12	Slight	V. slight	S. foul	0.2	3.60	1.90	.0020	.0026	.0000	.0000	.20	2.4	..	..
	1905														
3269	Oct. 30	None	Slight	None	0.3	4.6	2.6	.0010	.0050	.0100	.0000	.56	0.6	....	*
3319	Nov. 28	.....	.....	.....	....	.....	....	.....	.....	.....	.....	.50	....	....	*
	1906														
3846	Aug. 14	None	V. slight	None	0.1	4.4	3.4	.0014	.0062	.0100	.0000	.25	.22	...	..
4146	Nov. 13	None	None	None	0.15	4.3	3.1	.0010	.0080	.0200	.0000	.22	.9	....	..
	1907														
4400	Apr. 4	None	None	None	0.00	3.4	1.7	.0034	.0076	.0270	.0000	.20	1.2	....	..
4894	Oct. 26	S. opal	V. slight	Clayey	0.05	4.4	2.9	.0002	.0024	.0000	.0000	.17	.7	....	..
	1908														
5170	Mar. 16	None	V. slight	None	0.05	3.0	2.0	.0004	.0002	.0100	.0000	.17	1.2	....	..

* B. Coli present.

Forty-five samples representing private supplies were classified as, **thirteen good**, eleven good but for dissolved lead, fourteen of doubtful **character and seven** polluted.

PENACOOK (Ward 1, Concord).—The village of Penacook is supplied with water from two sources. That portion of the ward lying north of the Contoocook River is furnished from the Penacook and Boscawen water precinct system, the source being Walker Pond. For analysis and further description see Boscawen.

The remaining portion of the village is supplied with water from Penacook Lake by the Concord Water Works, the high pressure system of which was extended to Penacook in the summer of 1904. For further description see Concord.

Samples representing one good and one polluted supply were received from private sources.

PETERBOROUGH.—In 1896 the town installed a water supply from a brook fed by springs. The watershed is three miles by one mile in extent, consisting of pasturage and woodland. It is a gravity system of approximately ten miles of distributing mains, iron; service pipes of iron, cement lined. There are quite a number of wells still in use, but they are gradually being given up.

Chemical Examination of Water from Tap of Town Supply.

Number.	Date of collection.	Appearance.				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
	1902														
851	Oct. 10	None	None	Dec.veg.	0.4	6.30	1.80	.0000	.0062	.0000	.0000	.12	1.8	....	..
	1903														
1427	Aug. 10	None	V. slight	S. veg.	0.4	7.70	1.70	.0000	.0098	.0000	.0000	.10	1.6	....	..
1452	Aug. 17	None	V. slight	V. S. vg.	0.32	5.00	2.00	.0000	.0072	.0000	.0000	.10	1.9	....	..
	1904														
1979	May 23	None	None	None	0.3	3.50	0.50	.0000	.0046	.0000	.0000	.10	0.7	....	..
2467	Oct. 20	None	M. fine	S. musty	0.30	3.6	1.0	.0000	.0080	.0000	.0000	.10	0.7	....	..
2468	Oct. 20	None	None	V. slight	0.40	4.9	3.0	.0000	.0046	.0000	.0000	.25	2.0	....	..
2697	Feb. 14	None	None	V. slight	0.25	3.7	2.0	.0010	.0034	.0200	.0000	.12	0.6	....	..
3197	Sept. 25	None	None	None	0.40	5.3	3.0	.0006	.0096	.0050	.0000	.15	1.9	....	..
	1906														
3447	Feb. 5	None	None	None	0.10	3.0	1.2	.0010	.0032	.0050	.0000	.17	0.8	....	..
4199	Nov. 28	None	V. slight	None	0.10	2.5	1.0	.0030	.0084	.0050	.0000	.12	0.4	....	..
4200	Nov. 28	None	None	None	0.30	3.3	1.2	.0014	.0084	.0050	.0000	.20	1.2	....	..
	1907														
4531	May 13	None	None	Veg.	0.40	3.0	1.8	.0004	.0060	.0050	.0000	.05	0.9	....	..
4973	Oct. 21	None	None	None	0.40	5.0	2.9	.0004	.0058	.0070	.0000	.20	0.4	....	..

Twenty-nine samples taken from private supplies showed eight of good quality, twelve good but for dissolved lead, six doubtful and three polluted.

PIERMONT. No public supply.

PITTSBURG.—No public supply. Practically every house has its individual spring. The water is conveyed through iron pipe and wood pump logs. There is an abundance of spring water on the hillsides.

PITTSFIELD.—The Pittsfield Aqueduct Company installed a system of water works in 1884. The source is a pond one half mile long and an average of one eighth mile wide; average depth some ten feet, bottom largely stone and gravel. A little more than half the watershed, one mile by three fourths of a mile, is wooded; not over six permanent inhabitants. This pond has no visible inlet, but is fed from its own bottom.

The force is gravity, through an open brook, for a mile descending constantly, over a gravelly and rocky bottom; capacity of reservoir, 1,500,000 gallons. There are four miles of distributing mains, largely cement lined; service pipes, cement lined, plain iron, and galvanized iron. Four hundred families, substantially the whole village, are takers. Very few wells within the area.

Chemical Analysis of Water from the Pittsfield Aqueduct Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
	1903														
1112	Mar. 30	Distinct	Much fine	Veg.	0.2	3.90	1.70	.0024	.0046	.0100	.0001	.15	0.7	....	..
1117	Apr. 1	Distinct	Much fine	Veg.	0.22	5.30	2.30	.0000	.0042	.0150	.0000	.15	1.4	....	..
1456	Aug. 19	V. slight	V. slight	Decided veg.	0.22	2.70	1.10	.0000	.0068	.0000	.0000	.15	1.1	....	..
	1904														
1984	May 24	Slight	Slight fine	Slight musty	0.15	8.00	3.20	.0020	.0046	.0000	.0000	.13	1.9	....	..
	1905														
2750	Mar. 13	None	None	None	0.1	6.0	4.0	.0096	.0050	.0150	.0005	.15	0.3	....	..
3194	Sept. 25	None	Slight	Foul	0.15	2.9	1.6	.0008	.0084	.0050	.0000	.17	1.2	....	..
	1906														
3456	Feb. 12	None	V. slight	Veg.	0.10	2.8	2.0	.0014	.0074	.0050	.0000	.42	0.7	....	..
3878	Aug. 22	None	Consid.	Earthy	0.20	5.7	1.4	.0016	.0192	.0000	.0000	.12	0.1	....	*a*
3879	Aug. 22	Consid.	Consid.	S. earthy	0.20	6.0	1.9	.0028	.0184	.0000	.0000	.12	0.1	...	*b*
	1907														
4526	May 13	None	V. slight	Musty	0.15	5.2	2.6	.0014	.0320	.0050	.0000	.24	0.7	....	..
5064	Dec. 11	None	None	Sl. foul.	0.40	2.8	2.3	.0006	.0084	.0100	.0100	.15	0.4	...	*

* B. Coli present. *a* from pond; *b* from reservoir.

The single private supply examined was found of good quality.

PLAINFIELD.—A private supply was introduced in 1890–'91 by the Meriden Water Company. The source of the supply is springs dug from 7 to 10 feet deep, and flowing from 10 to 30 gallons per minute. The watershed has an area of about 100 acres, all cleared. The water flows by gravity to two reservoirs, one 20 x 25 x 8 feet, and having a capacity of 1,000 barrels; the other 13 feet in diameter by 12 feet deep. Plain wrought iron pipe. Twenty families, besides the hotel and boarding house, are supplied from this source. There are many individual wells in the locality.

Chemical Examination of Water of Meriden Water Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
860	1902 Oct. 13	Marked	Much min.	Slight	0.1	10.00	5.00	.0000	.0000	.0000	.0000	.06	4.5	....	..
1974	1904 May 23	None	None	S. earthy	0.0	5.60	4.70	.0024	.0038	.0300	.0000	.10	4.5	...	..
2595	Dec. 14	None	None	None	0.00	7.0	5.1	.0000	.0014	.0300	.0000	.30	3.7	....	..
2691	1905 Feb. 9	None	S. fine	None	0.05	9.2	6.0	.0000	.0000	.0150	.0000	.12	3.5	....	..
3179	Sept. 19	Slight	None	None	0.10	6.4	4.4	.0010	.0082	.0050	.0000	.05	3.1	....	..
3201	Sept. 27	None	Slight	S. earthy	0.10	14.6	11.4	.0008	.0064	.2000	.0000	.57	8.2	....	a
3432	1906 Feb. 1	None	None	None	0.0	6.7	4.3	.0008	.0014	.0080	.0000	.05	2.6	....	..
4041	Oct. 2	None	Slight	Sl. veg.	0.10	13.2	11.2	.0010	.0030	.0050	.0000	.05	7.4	...	..
4042	Oct. 2	None	Sl. fine	Veg.	0.10	15.5	13.5	.0028	.0041	.0100	.0000	.05	8.3	....	..
4176	Nov. 21	V. sl. opal	V. slight	Sl. foul.	0.20	9.0	6.0	.0010	.0056	.0100	.0000	.42	5.3	....	*
4493	1907 Apr. 30	None	None	None	0.00	5.5	4.0	.0004	.0018	.0120	.0000	.09	2.9	....	..
5054	Nov. 27	None	None	Sl. veg.	0.00	5.8	4.8	.0014	.0028	.0150	.0000	.18	3.2	....	..
5055	Dec. 3	None	None	None	0.20	.....	.....	.0002	.0048	.0060	.0000	.20	3.9	....	..

a Pond supplying ice.
* B. Coli present.

Six private supplies examined showed one of good quality, four doubtful and one polluted.

Plaistow.—Most of the supply is from private wells.

Four samples from private sources indicated a polluted condition while the analysis of a fifth was unsatisfactory.

Plymouth.—The town installed a system of water works in 1880 and 1881, the supply being from springs and wells. The average depth of the wells is six feet. A foot of top soil is loam; below the loam is marl and gravel. The wells are dug. The water flows by gravity to two reservoirs having a capacity of 4,000,000 gallons; area, one acre; average depth, 12 feet. There are six miles of cement lines, and two miles of cast iron mains, with galvanized iron service pipes. Fifteen per cent. of the population take this water. There are about twenty-five private wells also in use.

Chemical Examination of Water from Town Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
627	1902 June 30	V. slight	None	Veg.	0.25	8.00	3.10	.0000	.0054	.0000	.0000	.10	2.3	....	*
629	June 30	Slight	Slight	Veg.	0.26	7.80	3.10	.0006	.0084	.0000	.0000	.12	2.3	....	†
630	June 30	Slight	Slight	Dec. vg.	0.26	8.10	2.00	.0006	.0120	.0000	.0000	07	1.9	....	‡
631	June 30	Slight	None	Dec. vg.	0.26	6.40	2.50	.0000	.0072	.0000	.0000	.07	1.9	....	§
1406	1903 Aug. 5	V. Slight	Slight	V. slight	0.2	5.00	2.70	.0000	.0066	.0000	.0000	.07	2.4	...	..
1585	Oct. 12	None	V. slight	None	0.25	7.40	4.70	.0016	.0052	.0150	.0000	.20	3.1	....	‖
1586	Oct. 12	None	Slight	None	0.2	7.10	3.80	.0000	.0036	.0200	.0000	.20	3.6	....	§§
1992	1904 May 27	Slight	Slight	Dec. vg.	0.25	5.20	2.60	.0008	.0042	.0000	.0000	.10	1.8	....	..
2702	1905 Feb. 14	None	V. slight	None	0.10	5.7	4.7	.0000	.0000	.0200	.0000	.08	1.9	....	..
3205	Sept. 28	V. slight	S. fine	M. veg.	0.30	6.0	3.7	.0014	.0144	.0100	.0000	.05	2.0	....	..
3301	Nov. 20	V. slight	Slight	M. veg.	0.30	6.6	4.0	.0044	.0164	.0100	.0000	.20	2.4	....	‡
3302	Nov. 20	None	V. slight	S. earthy	0.20	5.5	3.5	.0010	.0048	.0150	.0000	.07	2.0	....	†
3443	1906 Feb. 6	None	V. slight	None	0.10	5.5	3.5	.0006	.0034	.0100	.0000	.07	2.3	....	..
3974	Sept. 12	None	V. slight	S. veg.	0.05	9.0	4.5	.0010	.0028	.0100	.0000	.05	1.9	....	..
4490	1907 Apr. 30	V. sl. opal	V. slight	Sealing wax	0.00	3.1	2.2	.0006	.0004	.0050	.0000	.13	2.7	....	..
5509	1908 Aug. 13	None	None	None	0.00	4.1	2.3	.0004	.0000	.0050	.0000	.08	0.4	....	..

* Sample taken from faucet in mill.
† Sample taken from Reservoir No. 1.
‡ Sample taken from Reservoir No. 2.
§ Sample taken from faucet in drug store.
‖ Stream to Reservoir No. 2.
§§ Stream to Reservoir No. 1.

Six samples representing private sources showed two supplies of good quality, one good but for lead, one of doubtful character and two polluted.

PORTSMOUTH.—The city constructed a system of water works in 1891, the source being wells and springs. The watershed is about four square miles in area, partly wooded; no inhabitants very near. The wells are driven from 70 to 100 feet, in gravel. The water is pumped to a standpipe having a capacity of 500,000 gallons. There are very few private wells.

Chemical Examination of Water from Portsmouth Water Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
621	1902 June 27	None	Slight floc.	S. arom.	0.0	10.40	8.80	.0000	.0018	.0150	.0000	.27	4.5	..	....
1405	1903 Aug. 4	None	Slight	None	0.0	16.50	11.10	.0000	.0010	.0500	.0008	.57	8.7	..	....
2774	1905 Feb. 24	Slight	Slight	Peculiar	0.10	39.7	33.5	.0094	.0044	.2000	.0066	6.12	12.5	..	*a
2781	Mar. 29	V. mark.	M. floc.	Dec. vg.	0.60	5.7	2.6	.0000	.0082	.0150	.0000	.32	0.9	..	b
2881	1906 June 2	None	None	None	0.10	18.0	13.7	.0014	.0014	.2000	.0010	.70	10.3	..	c
2992	July 18	None	None	None	0.10	24.2	20.2	.0000	.0020	.0200	.0000	5.70	8.2	..	d
3019	July 26	S. opal	Slight	.....	....	.....	.....	.0032	.0032	.1200	.0020	6.40	....	..	d
3045	Aug. 3	None	S. veg.	Veg.	0.55	12.5	9.0	.0010	.0112	.0500	.0000	.54	5.4	..	e
4527	1907 May 13	None	V. slight	None	0.05	15.0	12.5	.0010	.0006	.0200	.0000	.58	7.1	..	....
5058	Dec. 4	None	None	None	0.05	13.9	11.5	.0004	.0010	.0040	.0000	.50	6.7	..	....

* B. Coli present; *a* Madison Street reservoir; *b* reservoir Peverly Springs; *c* fountain head, newly driven well; *d* Hanover Street reservoir; *e* Peverly Spring Brook.

Of ten samples representing private supplies, four were found of good quality, one good but for lead, two in poor condition and three polluted.

RANDOLPH.—All the inhabitants, summer boarding-houses and summer cottages get water from springs. Only two wells in use in town.

RAYMOND.—In 1893 the town installed a public water supply from a system of wells driven from 40 to 60 feet deep, through loam, sand and gravel. The water is pumped to a standpipe having a capacity of 118,037 gallons. The watershed is about one square mile in area, is about equally wooded and cleared, and on it are about 600 inhabitants. There are a few wells in the locality.

Chemical Examination of Water from Faucet of Raymond Water Works.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
376	1902 Jan. 24	None	None	V. slight	0.0	11.90	8.50	.0010	.0064	.1900	.0000	1.62	4.2	....	..
1404	1903 Aug. 4	Slight	V. S. fine	Slight	0.0	18.10	11.90	.0030	.0020	.2900	.0002	2.15	6.0	....	..
2018	1904 June 6	None	None	None	0.05	19.10	14.20	.0010	.0020	.4000	.0000	2.65	7.7	....	..
2695	1905 Feb. 14	None	None	Slight	0.0	14.2	10.8	.0000	.0000	.3000	.0000	2.50	4.1	....	..
3195	Sept. 25	Slight	S. ferrug.	Slight	0.08	15.9	10.1	.0006	.0030	.2000	.0000	1.95	4.6	....	..
3441	1906 Feb. 5	None	None	Slight	0.05	14.5	11.8	.0006	.0034	.0500	.0000	2.21	4.6	....	..
4521	1907 May 10	None	V. slight	None	0.00	15.7	10.7	.0014	.0006	.0300	Tr.	2.30	4.8	....	..
5058	Dec. 4	None	S. ferrug.	None	0.00	16.7	12.8	.0004	.0014	.4000	.0000	2.18	6.0	....	..

RICHMOND.—Wells and springs, about 12 to 30 feet deep, in sandy loam, furnish water for this town.

RINDGE.—Each dwelling has its individual well. Three private supplies investigated and showed one of good quality and two in poor condition.

ROCHESTER.—The Rochester Water Works, owned by the city, installed in 1885, has for a source a pond and reservoir, the pond being about one hundred acres, and the reservoir two hundred acres in area. The watershed, several square miles in extent, is both wooded and cleared, with, perhaps, 75 inhabitants. There are not many private wells in the locality.

Chemical Examination of Water from Tap of City Supply, Rochester.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as				Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.	Chlorine.	Hardness.		
878	1902 Oct. 17	None	None	S. veg.	0.15	5.70	1.00	.0000	.0086	.0000	.0000	.15	0.9	...	..
1436	1903 Aug. 13	V. mark.	Much fine veg.	Peculiar veg.	0.35	7.00	2.10	.0036	.0560	.0000	.0000	.20	0.4	....	..
2020	1904 June 6	Slight	Consid. fine	Dec. m'styvg.	0.2	3.10	2.20	.0020	.0198	.0000	.0000	.15	....	....	..
2700	1905 Feb. 15	None	None	V. slight	0.3	3.5	2.0	.0140	.0088	.0300	.0000	.22	0.4	....	..
3446	1906 Feb. 6	None	None	V. slight	0.10	2.7	1.1	.0006	.0064	.0050	.0000	.17	0.3	....	..
4558	1907 May 22	V. slight	S. floc.	Slight	0.50	.....	....	.0012	.0120	.0100	.0000	.25	0.4	....	..
4974	Oct. 22	None	S. mod. coarse	None	0.05	2.1	.9	.0014	.0088	.0030	.0000	.19	0.4	....	..
5062	Dec. 4	None	None	S. veg.	0.10	.....	....	.0006	.0078	.0060	.0000	.26	1.2	....	..
5346	Aug. 26	Slight	V. S. coarse	Foreign	0.10	3.3	1.2	.0010	.0066	.0030	.0000	.15	0.4	....	..
5547	Aug. 26	Slight	Slight	None	0.10	2.5	1.2	.0012	.0060	.0020	.0000	.20	0.4	....	..

Sixteen samples representing private sources were classified as five good, four doubtful and seven polluted.

ROLLINSFORD.—No public or private water companies. Three samples from private supplies were received, all of bad quality.

ROXBURY.—No public supply. The single private supply examined was found to carry an excess of lead.

RUMNEY.—Water is obtained from private wells and springs. One private supply examined was found of good quality.

RYE.—The water supply is wholly from wells and springs. The ground is gravel, with an underlying stratum of hardpan, which is about like stone. The underground flow is large, there being no natural ponds or streams of any size in the town. Of private supplies two of good and four of doubtful character were examined.

SALEM.—A private water supply was installed in 1903 by the Salem Water Works Company. The source of supply, Canobie Lake, is of about 1,000 acres in area, 40 feet in depth on an average, and gravelly bottom. The watershed is approximately 500 acres, mostly wooded. The shore of the pond, upon which is Canobie Lake Park, is frequented by summer cottagers and excursionists. The water flows by gravity through about three miles and a half of iron main pipe, and the service pipes are of galvanized iron. It is estimated that 15 per cent. of the population use this water.

Chemical Examination of Water taken from Canobie Lake.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
	1901														
228	Oct. 27	None	Slight	Dec.veg.	0.1	2.80	1.50	.0000	.0176	.0000	.0000	.21	1.2	....	..
229	Oct. 27	None	Slight	Dec.veg.	0.1	3.00	1.20	.0000	.0192	.0000	.0000	.23	1.2	....	..
	1904														
2045	June 13	Slight	Slight	Marked veg.	0.05	6.20	2.80	.0014	.0136	.0000	.0000	.30	2.6	....	..
	1905														
2706	Feb. 20	None	S. floc.	Dec.veg.	0.00	3.7	2.1	.0010	.0060	.0800	.0000	.30	0.6	....	..
3203	Sept.28	None	None	S. foul	0.10	3.7	1.7	.0008	.0080	.0050	.0000	.37	1.1	....	..
	1906														
3882	Aug. 8	None	None	None	0.10	4.2	2.7	.0014	.0082	.0050	.0000	.35	0.6	....	..
	1907														
4818	Aug. 21	None	None	None	0.05	...	....	.0012	.0074	.0050	.0000	.38	1.2	....	..

Three private supplies investigated were found of poor quality, while a fourth was reported as polluted.

SALISBURY.—No public supply. Eight samples representing private supplies showed one good, one good but for lead, two doubtful and four polluted.

SANBORNTON.—No public supply.

SANDOWN.—No public supply. Two polluted supplies and one good quality were reported upon.

SANDWICH.—No public supply. Of seven private supplies examined one was reported as good, one doubtful and five as polluted.

SEABROOK.—No public supply. The single private supply examined was found to be polluted.

SHARON.—No public supply.

SHELBURNE.—No public supply.

SOMERSWORTH.—A system of water works was constructed in 1905–'06. The water is taken from Salmon Falls River directly to a filter-bed of modern construction and capable of filtering about 1,500,000 gallons in 24 hours. The water is pumped from the storage channels of the filter-bed to a standpipe of ample capacity, from which it is distributed about the city.

The sand filter referred to is constructed after the plans of the Filtration Experiment Station, at Lawrence, Mass., and is the only one of the kind in this state. The entire plant, pumping station, filtering-bed and standpipe is a model construction and a credit to the city.

Considerable embarrassment is being experienced of late by the water management owing to the large amount of manufacturing waste discharged into the river at points above. Much of this is in connection with the manufacture of "leather-board," and the colloid iron, constituting a part of such waste, is said to be causing no little trouble by accumulating on the filter and seriously interfering with its operation. The river also receives the sewage from the villages of North and East Rochester. Measures for relief from these conditions are now under consideration.

Chemical Examination of Salmon Falls River Water from Various Sources.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
60	1901 July 11	None	None	Dec.veg.	0.7	4 50	2.50	.0074	.0167	.0050	.0003	.33	1.8	...	...
497	1902 May 5	None	None	Veg.	0.5	4.00	1.90	.0006	.0056	.0200	.0000	.15	1.2	...	...
585	June 11	None	None	S. veg.	0.55	6.60	1.50	.0000	.0092	.0200	.0000	.14	1.2	...	...
647	July 14	None	None	Dec.veg.	0.6	4.70	2.20	.0000	.0098	.0200	.0000	.14	1.8	...	...
657	July 17	None	V. slight	V. slight	0.5	6.10	2.20	.0020	.0154	.0200	.0000	.15	2.2	...	...
788	Sept. 9	None	None	S. veg.	0.45	8.30	2.40	.0014	.0100	.0100	.0000	.15	2.4	...	...
935	Nov. 21	None	None	S. veg.	0.5	5.20	1.60	.0000	.0082	.0000	.0000	.20	1.6	...	...
1018	1903 Jan. 30	None	None	Veg.	0.5	8.40	2.40	.0000	.0060	.0000	.0000	.15	2.3	...	...
1312	July 8	None	V. slight	V. S.veg.	0.6	5.50	1.20	.0000	.0046	.0150	.0000	.08	1.2	...	...
1424	Aug. 10	None	V. slight	Veg.	0.4	5.90	2.30	.0000	.0086	.0300	.0000	.20	2.3	...	...
1832	1904 Feb. 9	Slight	None	M. veg.	0.4	4.70	2.40	.0018	.0046	.0000	.0000	.20	2.0	...	...
2007	May 31	None	Slight	V. slight	0.45	5.80	1.90	.0000	.0048	.0000	.0090	.18	1.5	...	...
2199	July 25	None	None	V. slight	0.4	6.80	3.70	.0006	.0038	.0000	.0000	.25	3.7	...	...
2619	Dec. 30	None	None	None	0.15	6.2	3.7	.0000	.0000	.0150	.0002	.21	1.9	...	...
2620	Dec. 30	None	Much	V. slight	0.15	5.8	3.8	.0000	.0020	.0150	.0000	.21	1.9	...	...
2714	1905 Feb. 21	None	None	S. veg.	0.30	6.5	3.3	.0000	.0010	.0250	.0000	.25	1.4	...	*
2760	Mar. 21	Marked	V. much	Dec.veg.	0.35	6.0	3.8	.0014	.0060	.0000	.0000	.20	1.2	...	*a
2761	Mar. 21	Marked	V. much	Dec.veg.	0.35	6.1	2.9	.0000	.0092	.0000	.0000	.20	1.2	...	*b
2762	Mar. 21	Marked	V. much	Dec.veg.	0.55	5.7	2.8	.0026	.0086	.0000	.0000	.30	1.1	...	...
3075	Aug. 14	None	None	None	0.60	6.3	3.0	.0008	.0128	.0100	.0000	.25	1.8	...	...
3463	1906 Feb. 13	None	V. slight	Slight	0.40	5.0	3.0	.0006	.0014	.0050	.0000	.20	1.6	...	...
4239	Dec. 20	None	V. slight	Sl. veg.	0.25	6.0	3.8	.0010	.0080	.0000	.0000	.35	2.5	...	*
4263	1907 Jan. 2	V. slight	V. slight	Earthy	0.20	.....	....	.0014	.0050	.0000	.0000	.23	2.6	...	*
4283	Jan. 15	None	None	Earthy	0.50	.....	....	.0014	.0080	.0000	.0000	.20	3.9	...	*
4340	Feb. 11	None	None	Marked woody	0.35	.....	....	.0016	.0046	.0030	.0000	.25	2.2	...	*
4402	April 4	None	None	Veg.	0.50	4.9	2.5	.0010	.0082	.0000	.0000	.22	1.2	...	*
4817	Aug. 19	None	Consid. floc.	None	0.25	6.0	4.0	.0050	.0044	.0050	.0000	.38	2.5	...	c
4962	Oct. 18	Mod. opal	Consid. floc. fibr.	Earthy	0.70	6.2	4.6	.0024	.0136	.0020	.0000	.28	1.2	...	*d

Chemical Examination of Salmon Falls River Water from Various Sources.—Continued.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
	1907														
4963	Oct. 18	Sl. opal	Sl. mod. coarse	Sl. grass	0.70	5.0	3.0	.0050	.0124	.0020	.0000	.26	1.9	...	*e
5060	Dec. 4	None	V. slight	Sl. veg.	0.60	4.7	2.2	.0040	.0084	.0050	.0000	.11	1.6	...	...
	1908														
5256	Apr. 27	Slight	Mod. floc.	Earthy	0.40	4.5	1.2	.0026	.0130	.0080	.0000	.22	1.5	...	*d
5257	Apr. 27	None	Slight	Sl. stale	0.30	3.4	1.2	.0010	.0066	.0100	.0000	.18	0.7	...	*f*

* B. Coli present.
a Salmon Falls River, 500 feet from the leatherboard factory.
b Salmon Falls River, 1,000 feet below mills and town sewer.
c Pipe in bottom of filter bed at pumping station.
d Salmon Falls River at North Rochester.
e Salmon Falls River at inlet of filter.
f Salmon Falls River at Milton.

Chemical Examination of Water from Littal River.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
	1907														
4964	Oct. 18	V. slight	V. slight	Slight	0.80	5.6	2.3	.0006	.0124	.0060	.0000	2.8	0.4	....	..

The analysis of eight samples representing private sources indicated five of doubtful character and three polluted.

South Hampton.—No public supply. One private supply examined was found of good quality.

Springfield.—The water for this town is supplied by private wells and springs. One private supply examined was found to contain an excess of lead.

STEWARTSTOWN, WEST.—The Consolidated Water Company furnishes water to 25 families, the source being several springs and a few wells. There are still a few deep wells in the locality, dug from 15 to 20 feet, on a level with the river, and which have good supplies of water. The reservoir has a capacity of 16,000 gallons, and the water flows by gravity through two miles of pipe, galvanized iron service pipes. Sixty families, half the population, are supplied.

Chemical Examination of Supply of Consolidated Water Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.			
3220	1905 Oct. 4	None	Slight	Earthy	0.0	10.3	5.8	.0014	.0014	.0350	.0004	.25	5.0	....

One private supply was found to be of poor quality.

STODDARD.—No public supply. Most of the families are supplied from individual wells; a few from Long Lake.

STRAFFORD.—No public supply.

STRATFORD.—The village of North Stratford has two private water supplies. In 1882 Mr. Clark Stevens installed a supply from a system of springs, the watershed being about sixty acres, mostly cleared land, no inhabitants. The springs are seven in number, stoned from five to seven feet deep. In 1888, Mr. J. C. Hutchins introduced a second supply, also from springs stoned about six feet deep, with same kind of soil as first supply. The watershed is about five square miles in area, mostly cleared land, no inhabitants. The water is distributed, by gravity, through three miles of galvanized iron pipe, both service and mains. Sixty families, 95 per cent. of the population, take this water.

The single private supply examined was found of good quality.

Chemical Examination of Water Supplying Stratford.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
800	1902 Sept.11	None	None	None	0.0	5.60	2.20	.0010	.0030	.0150	.0000	.05	1.9	..	*a*
801	Sept.13	None	None	None	0.0	6.10	2.10	.0000	.0000	.0200	.0000	.05	2.0	..	*b*
3261	1905 Oct. 27	None	None	None	0.10	7.3	3.8	.0010	.0042	.0300	.0000	.05	2.4	..	*b*
3262	Oct. 27	None	V. slight	V. slight	0.30	7.5	3.9	.0014	.0048	.0100	.0000	.05	1.9	..	*a*
3513	1906 Mar. 9	None	None	None	0.05	4.0	2.3	.0008	.0016	.0100	.0000	.12	1.8	..	*a*
3514	Mar. 9	None	None	S. fishy	0.05	7.2	3.6	.0008	.0016	.0100	.0000	.05	2.7	..	*b*
4240	Dec. 20	None	V. slight	None	0.15	7.0	4.0	.0006	.0040	.0050	.0000	.05	1.8	..	*a*
4241	Dec. 20	None	None	None	0.00	8.7	7.0	.0008	.0014	.0050	.0000	.05	3.2	..	**b*
4332	1907 Feb. 5	None	None	None	0.00	.....	....	.0010	.0000	.0200	.0000	.06	2.4	..	*b*
4602	May 30	None	None	None	0.00	5.7	3.0	.0008	.0004	.0050	.0000	.14	1.9	..	**b*
5085	Dec. 18	None	V. slight	None	0.00	3.1	2.5	.0006	.0002	.0060	.0000	.12	1.9	..	*a*

* B. Coli present. *a* Hutchins' supply. *b* Stevens' supply.

STRATHAM.—No public or private water companies. Three private supplies were found to be of poor quality.

SULLIVAN.—No public supply.

SUNAPEE.—The Sunapee Water Works, owned by the town, were built in 1900, Sunapee Lake being the source from which water is taken to supply the Sunapee village, and Ledge Pond for George's Mills. Water from the pond flows by gravity, while that from the lake is pumped to a reservoir of 300,000 gallons' capacity. There are about five miles of distributing mains of cast iron and galvanized iron pipes. About one hundred and twenty-five families — some 80 per cent. of the population — are using this supply. The Lake Sunapee Water Supply Company, a private company of 23 stock owners and takers, installed its works in October, 1886. The water is taken from Sunapee Lake, and flows by gravity. The plant is nearly worthless at this time, as the pipes are of small size and filled with rust.

Chemical Examination of Water from Lake Sunapee and from Ledge Pond.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
806	1901 Dec. 4	Slight	M. floc.	Dec. vg.	0.6	3.00	1.80	.0000	.0094	.0000	.0000	.08	1.5	.0400	*
823	1902 Sept. 22	None	Slight	S. musty	0.1	3.50	.60	.0000	.0112	.0000	.0000	.07	0.6	.. ..	a
824	Sept. 22	None	V. slight	Dec. vg.	0.15	3.40	.70	.0000	.0090	.0000	.0000	.10	0.6	.....	..
1418	1903 Aug. 10	V. slight	V. slight	V. dec. veg.	0.1	3.60	2.80	.0000	.0080	.0400	.0000	.07	2.8	.....	..
1419	Aug. 10	None	V. slight	Dec. vg.	0.05	3.50	0.90	.0000	.0122	.0000	.0000	.05	0.9	.....	..
2019	1904 June 6	None	V. slight	S. foul	0.2	3.50	2.10	.0012	.0052	.0000	.0000	.10	2.0	.....	..
2713	1905 Feb. 21	V. slight	Slight	Slight	0.10	3.6	1.9	.0000	.0014	.0900	.0000	.10	0.6	.....	..
3237	Oct. 17	None	None	S. veg.	0.10	4.0	1.4	.0010	.0058	.0050	.0000	.05	0.9	.....	..
3468	1906 Feb. 19	None	None	None	0.00	3.5	2.0	.0010	.0038	.0050	.0000	.10	0.7	.....	..
3471	Feb. 21	None	None	S. veg.	0.10	3.0	2.0	.0010	.0038	.0100	.0000	.10	0.9	.....	a
3862	Aug. 20	None	None	None	0.20	3.7	2.2	.0026	.0094	.0100	.0000	.10	0.4	.....	..
3894	Aug. 23	V. slight	V. slight	Marked earthy	0.10	3.9	2.4	.0014	.0094	.0050	.0000	.10	0.4	.....	a
4405	1907 Apr. 5	S. opal	V. slight	S. earthy	0.10	2.4	1.0	.0034	.0090	.0000	.0000	.05	1.2	....	..
4534	May 15	None	S. coarse	S. veg.	0.15	3.0	1.2	.0030	.0082	.0120	.0000	.12	1.2	.....	..
5074	Dec. 12	None	None	None	0.10	2.3	1.2	.0008	.0078	.0040	.0000	.08	0.4	.....	..
5077	Dec. 13	None	None	None	0.20	4.0	2.0	.0014	.0096	.0100	.0000	.12	0.4	.....	a
5396	1908 July 2	V. slight	S. floc.	Marked earthy	0.20	.....	.....	.0002	.0036	.0070	.0000	.10	0.4	.....	..

* Sample taken from private supply through 150 feet of lead pipe.
a Sample taken from Ledge Pond, George's Mills water supply.

Four samples, representing private supplies, were found to carry dissolved lead.

Sutton.—One well, owned by the town, furnishes water through a lead pipe, some 500 or 600 feet, to a trough, one end for horses, and from the other several families get their drinking-water. Six samples from private supplies showed one good, one good but for lead, three doubtful and one polluted.

SWANZEY.—No public supply.

Chemical Examination of Water Supplying School at West Swanzey.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
4661	1907 June 23	Slight	S. coarse	Marked earthy	.05	10.5	6.3	.0116	.0024	.0050	.0006	.85	2.5	....	..

Seven samples from private supplies showed two of good quality, three doubtful and two polluted.

TAMWORTH.—No public supply. Water is obtained from individual springs and wells. Of the three private supplies investigated, two were found to be good, the third containing too much lead for safety.

TEMPLE.—No public and no private system of water works. Water is obtained from individual springs, which flow by gravity and from wells. The single private supply examined was found of inferior quality.

THORNTON.—No public supply. Water is obtained from springs and wells, through lead and iron pipes. Four private supplies examined showed three carrying lead and one polluted water.

TILTON.—A private supply was installed by the Tilton and Northfield Aqueduct Company in 1887–'88, the source being a pond of about sixty acres in area, from 10 to 75 feet deep; sand and gravel bottom, with but very little mud. The watershed is several hundred acres in extent, wooded and pasture, with five farms. (For analysis of this supply see Northfield.) Mostly cement-lined pipe is used; some iron. There are still a very few wells in the locality, although most of them have been abandoned. Nine samples, representing private supplies, were classified as, four good, four questionable and one polluted.

TROY.—The water supply is entirely from private wells. The analysis of twelve samples from private sources showed two good, four good but for lead, four doubtful and two polluted.

TUFTONBOROUGH.—The water supply of the town consists of private wells and springs, of which nearly every family has one or more. There are several watering-troughs by the roadside which are fed by springs

near by. These watering places are paid for by the town at the rate of three dollars each per year.

UNITY.—This is a farming town wholly. Most of the people obtain water from common wells. A few families have spring water.

WAKEFIELD.—The water supply is from wells, dug to an average depth of 15 feet through sand and ledge.

The health officer, W. S. Davis, M. D., writes: "In the villages of Union and Wakefield, in the town of Wakefield, the water supply is the same: viz., wells, all contaminated with sewage. I wish the State Board of Health would compel this town to put in a system of water supply. I am using distilled water for drinking and cooking purposes. From your analyses of water I have sent you, there can be no doubt of the quality of the water here."

Fourteen samples from private supplies indicated two good, two questionable and ten polluted.

WALPOLE.—The Walpole Water & Sewer Company inaugurated a system of water works in 1904. It consists of a reservoir having an area of about two acres and an average depth of about 10 feet, constructed on a small stream. The site was stripped to a gravel and hard dirt bottom. The watershed is about six tenths of a square mile, wooded and cleared. Two families at a considerable distance from brook.

The force is gravity, four miles of coated cast iron mains, with galvanized iron service pipes, being used. Eighty families, 50 per cent. of the population of Walpole village, have this supply. There are many private wells within the area.

The water from the reservoir above referred to flows through a filter plant; thence into a distributing reservoir of concrete construction, covered on top, of about 50 feet diameter, 18 feet deep; capacity about 250,000 gallons.

Chemical Examination of Water from the Company's Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
2082	1904 June 20	None	S. floc.	S. musty	0.1	7.30	4.60	.0048	.0032	.0200	.0000	.15	4.1	...	..
2119	July 3	Slight	Slight	S. veg.	0.1	5.50	3.90	.0052	.0038	.0000	.0000	.15	3.2	....	*
2591	Dec. 13	None	Slight	M. foul	1.5	6.3	4.0	.0000	.0034	.0000	.0001	.20	3.2	...	..
2779	1905 Mar. 26	None	Slight	Dec. vg.	0.2	5.3	3.5	.0000	.0030	.0150	.0000	.10	1.9	....	..
2994	July 18	V. slight	Much	Dec. vg.	0.8	7.7	4.4	.0024	.0142	.0050	.0000	.07	3.1	....	..
3476	1906 Feb. 19	None	None	None	0.0	5.8	3.8	.0014	.0014	.0050	.0000	.12	2.4	....	*†
3640	May 30	None	Slight	None	0.05	2.0	1.0	.0010	.0040	.0100	.0000	.15	....	....	..
3641	May 30	None	None	Slight	0.10	4.5	3.0	.0010	.0014	.0050	.0000	.25	1.6	....	..
4342	1907 May 17	None	V. slight	Veg.	0.15	5.8	3.1	.0002	.0020	.0050	.0000	.15	2.5	....	..
5080	Dec. 16	None	None	None	0.10	4.6	3.8	.0014	.0010	.0050	.0000	.30	2.6	....	*
5121	1908 Jan. 24	.....	.....	.....	....	.....	....	.....	.....	.....	.....	....	....	....	‡
5552	Aug. 24	V. slight	V. slight	None	0.05	.....	....	.0034	.0024	.0150	.0000	.18	2.4	....	..

* B. Coli present; *† B. Coli present, but not detected in check sample; ‡ B. Coli not present.

Chemical Examination of Water from Town Well.

5551	1908 Aug. 21	None	V. slight	None	0.00	17.8	13.7	.0004	.0018	.2200	.0000	2.11	5.0	....	..

Four samples, representing private sources, showed two of good quality, one good but for lead and one polluted.

Warner.—In 1895 a supply was introduced by private parties, which was later purchased by the Warner Village Fire District. This consists of a reservoir supplied by springs and a brook. The bottom is clayey hardpan in part, and part gravel; average depth, eight feet. Cast iron and galvanized iron pipe is used. The watershed is estimated at 400 acres, wooded. Not more than 12 inhabitants. The volume of water varies greatly. The water flows by gravity. There are quite a number of private wells in the locality. There are many private supplies which are piped from springs long distances through lead pipe.

Chemical Examination of Water from a Faucet of the Village District Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
754	1902 Aug. 29	None	None	V. slight	0.3	5.30	2.00	.0000	.0110	.0000	.0000	.10	1.5	....	..
1417	1903 Aug. 10	Slight	Fine	Foul vg.	0.1	4.20	1.60	.0000	.0106	.0000	.0000	.08	1.6	....	..
2122	1904 July 6	Slight	S. fine	S. veg.	0.25	5.60	2.10	.0000	.0050	.0000	.0000	.10	1.2	....	..
2715	1905 Feb. 22	None	None	V. slight	0.10	5.3	3.2	.0000	.0010	.0000	.0000	.12	1.2	....	..
3470	1906 Feb. 19	None	None	None	0.05	2.5	1.8	.0010	.0020	.0100	.0000	.15	1.1	....	..
4133	Nov. 7	None	None	Slight	0.35	5.2	3.0	.0014	.0100	.0100	.0000	.10	1.8	....	..
4555	1907 May 22	None	S. floc.	Veg.	0.10	2.3	1.8	.0004	.0046	.0100	.0000	.10	0.7	....	..
5079	Dec. 17	None	None	None	0.20	2.2	1.6	.0012	.0024	.0070	.0000	.15	0.4	....	..

Twenty-two samples from private sources were received, including eleven of good quality, five good but for dissolved lead, two questionable and four polluted.

Warren.—There are two private systems of water works in town; one, the Warren Water Works, was built in 1873, the source being a spring about a mile distant. The water flows by gravity through galvanized iron pipe. Nineteen families are supplied from this source. The other supply, the H. N. Merrill Water Works, was installed about the year 1895. This supply is from a spring and driven well 474 feet deep. The water flows partly by gravity and partly by being pumped into a reservoir. Ten per cent. of the population, 24 families, take this water, which is delivered through one mile of iron main and galvanized iron service pipes. Several families have private supplies, pipes from springs on elevated ground. There are not many private wells within the radius of these supplies.

Chemical Examination of Water from Various Sources.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
875	1902 Oct. 17	Slight	Fine	V. slight	0.1	7.20	2.60	.0000	.0116	.0000	.0500	.09	1.95	...	*a*
877	Oct. 17	None	None	S. veg.	0.1	6.50	2.70	.0000	.0038	.0000	.0000	.10	2.7	...	*b*
3227	1905 Oct. 10	None	None	None	0.05	5.4	2.1	.0020	.0020	.0100	.0000	.12	1.1	...	*b*
3472	1906 Feb. 22	None	None	None	0.0	8.5	7.5	.0040	.0010	.0100	.0000	.10	4.6	...	*a c*
3473	Feb. 22	V. slight	V. slight	None	0.0	2.9	2.3	.0030	.0024	.0100	.0000	.10	1.4	...	*a d*
4543	1907 May 18	None	None	Sl. veg.	0.00	4.6	3.4	.0004	.0006	.0700	.0000	.05	2.5	...	*a*
5075	Dec. 13	None	None	None	0.5	.....	....	.0008	.0024	.0040	.0000	.15	1.2	...	*a*

a From H. N. Merrill Water Works; *b* from Warren Water Works; *c* from well; *d* from spring.

Chemical Examination of Water from Stream, Proposed Site of State Sanitarium for Consumptives.

4780	1907 Aug. 3	None	S. floc.	None	0.10	3.1	0.8	.0010	.0080	.0050	.0000	.13	0.4	...	...

Eighteen samples received from private sources were classified as three good, seven good but for lead, and eight of questionable character.

WASHINGTON.—No public supply. Most of the families have water from wells, dug, while some have spring water through lead or iron pipe. One private supply examined was found to be polluted.

WATERVILLE.—No public supply.

WEARE.—No public supply. Three private samples examined showed one good supply, one good but for dissolved lead and one polluted.

WEBSTER.—Water is obtained from private wells and springs. Seven private supplies examined showed three good, one good but for lead, and three of questionable character.

WENTWORTH.—The water supply is from private springs. The four samples from private supplies were found to represent water organically pure though one contained lead.

WESTMORELAND.—No public or private water systems.

WHITEFIELD.—The public water works, owned by the town, were built by private parties in 1892. There are two watersheds of about 30 acres each. The water flows by gravity to a reservoir having a capacity of about 1,000,000 gallons, and is delivered through five miles of cast iron mains, galvanized iron service pipes, to about 300 families, seven eighths of the entire population. There are no private wells within the radius of this system. Two private supplies of doubtful character and one lead contaminated were found.

Chemical Examination of Water from Town Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as			Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.	Chlorine.			
	1902														
861	Oct. 14	None	Slight floc.	Veg.	0.0	5.00	1.50	.0000	.0026	.0000	.0000	.04	1.5	....	..
	1903														
2143	July 11	None	None	S. veg.	0.1	6.60	2.60	.0050	.0034	.0000	.0000	.05	1.4	....	..
2429	Aug. 11	None	None	V. slight	0.0	4.40	2.40	.0022	.0058	.0000	.0000	.07	1.6	....	..
	1905														
2718	Feb. 23	None	None	None	0.0	4.4	3.0	.0000	.0014	.0300	.0000	.10	1.5	...	..
3133	Oct. 17	None	None	None	0.15	3.9	2.9	.0008	.0048	.0100	.0000	.05	0.6	....	..
	1906														
3484	Feb. 17	None	None	None	0.10	4.8	3.0	.0010	.0052	.0200	.0000	.05	0.9	....	..

WILMOT.—The water supply of this town is from private springs or wells. The single private supply examined was found of doubtful character as well as lead polluted.

WILTON.—The source of the supply is Mill Brook, with the intake at Gaerwen Falls, 250 feet above the bridge at East Wilton, about 1⅔ miles from the village. Mill Brook, or Gaerwen Falls Brook, rises on the eastern slope of the Pack Monadnock range of mountains, and has a watershed of nearly four square miles. It is also the outlet of Burton Pond, a sheet of water some 60 acres in extent which is dammed and will serve as an admirable storage reservoir. There are seven miles of 12-inch iron mains, with galvanized iron service pipes, through which the water is delivered by gravity to about 100 families. There are some private wells within the area.

Chemical Analysis of Water from Wilton Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
1869	1904 Mar. 13	None	S. floc. vg.	Marked veg.	0.2	4.30	2.10	.0010	.0048	.0000	.0000	.15	1.25	...	...
1915	May 1	None	Floc. veg.	S. veg.	0.3	2.80	1.20	.0014	.0082	.0000	.0000	.12	0.7	...	...
1982	May 23	Slight	Much veg.	Much vg.	0.35	4.80	1.20	.0000	.0076	.0000	.0000	.10	1.1	...	...
2124	July 5	V. slight	Slight	S. veg.	0.25	4.80	1.50	.0000	.0074	.0000	.0000	.15	0.7	...	...
2274	Aug. 14	None	V. slight	Musty veg.	0.25	4.20	1.90	.0000	.0034	.0000	.0000	.15	0.4	...	*
2363	Sept. 13	V. slight	V. slight	Dec. vg.	0.20	3.70	1.70	.0014	.0028	.0000	.0000	.20	0.9	...	*
2471	Oct. 4	Slight	Con. floc.	Dec. vg.	0.4	5.6	2.2	.0044	.0120	.0000	.0000	.35	1.4	...	*a
3342	1905 Oct. 18	None	V. slight	S. earthy	0.8	5.0	2.7	.0040	.0100	.0050	.0000	.25	1.4	...	*a
3271	Oct. 30	None	None	S. veg.	0.28	3.8	1.3	.0010	.0040	.0050	.0000	.27	0.4	...	a
3483	1906 Feb. 26	S. opal	Slight	Slight	0.20	6.9	3.7	.0020	.0090	.0200	.0000	.22	1.2	...	a
4827	1907 Aug. 21	None	None	None	0.05	3.9	1.6	.0016	.0044	.0050	.0000	.22	1.2	...	...

* B. Coli present; *a* reservoir.

Chemical Analysis of Water from Miller Brook.

1873	1904 Mar. 13	Slight	Slight	V. slight	0.25	3.40	1.70	.0024	.0046	.0000	.0000	.22	1.1	..	...
1983	May 23	Slight	Slight	Much vg.	0.3	4.50	1.40	.0010	.0096	.0000	.0000	.13	1.2	..	*
2126	July 5	Slight	Consid. earthy	S. veg.	0.25	4.80	1.60	.0000	.0032	.0000	.0000	.10	0.6	..	....
2276	Aug. 14	V. slight	S. floc. vg.	S. earthy	0.25	6.00	1.50	.0020	.0064	.0000	.0000	.20	0.9	..	*
2365	Sept. 13	V. slight	V. slight	V. dec. veg.	0.1	5.20	2.70	.0010	.0044	.0000	.0000	.15	1.7	..	*
2474	Oct. 4	None	S. floc.	Veg.	0.35	6.8	4.5	.0000	.0064	.0000	.0000	.30	1.1	..	*

* B. Coli present.

Chemical Examination of Water from Burton Pond.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
1914	1904 May 1	None	S. floc.	Veg.	0.3	3.20	1.60	.0030	.0104	.0000	.0000	.10	0.9	..	....
1986	May 24	Slight	Much fine	Dec. vg.	0.4	4.00	1.00	.0000	.0090	.0000	.0000	.10	0.4	..	....
2125	July 5	Slight	Con. fine.	Much vg.	0.5	4.30	.70	.0000	.0164	.0000	.0000	.10	0.4	..	....
2275	Aug. 14	None	Con. floc.	Musty veg.	0.4	5.60	1.70	.0020	.0158	.0000	.0000	.10	0.4	..	*
2364	Sept. 13	V. slight	V. slight	Dec. vg.	0.35	4.20	.90	.0026	.0166	.0000	.0000	.12	1.1	..	....
2473	Oct. 24	Slight	Con. floc.	Much vg.	0.6	3.9	1.4	.0020	.0284	.0000	.0000	.15	0.09	..	....

* B. Coli present.

Chemical Examination of Water from Blood Brook.

1871	1904 Mar. 18	None	Slight	V. S. vg.	0.15	2.70	1 60	.0012	.0054	.0000	.0000	.12	1.25		....
2127	July 5	Slight	Slight	S. veg.	0.15	10	1.20	.0000	.0066	.0000	.0000	.15	.60		....
2273	Aug. 14	None	None	Musty veg.	0.15	70	2 30	.0000	.0020	.0000	.0000	.20	.30		*
2366	Sept. 13	V. slight	V. slight	Dec. vg.	0.1	80	.50	.0014	.0044	.0000	.0000	.17	1.40		*
2472	Oct. 24	None	Con. floc.	Veg.	0.15	5	1.	.0034	.0060	.0000	.0000	.10	1.1		....

* B. Coli present.

Chemical Examination of Water from School Wells.

4019	1906 Oct. 27	V. slight	Mod. floc.	S. foul	0.05	5.4	3.4	.0022	.0048	.0100	.0000	.15	....	..	*a*
4014	Oct. 27	V. slight	Mod. floc.	Marked foul	0.10	5.0	3.0	H'vy	.0154	.0050	.0004	.10	...	..	**b*

* B. Coli present. *a* Well at Center School. *b* Well at Intervale School.

Eleven private supplies examined showed five of good quality, four good but for lead and two of doubtful character. One sample also carried much zinc.

WINCHESTER.—The whole town is supplied from private wells and springs. One private supply was found to be lead contaminated.

WINDHAM.—There is no public or private water system. There are five highway watering-troughs in town.

WINDSOR.—Water is obtained from private springs or wells.

WOLFEBORO.—The public water works, owned and operated by the town, were installed in 1889. The source of the supply is a pond of about 300 acres; depth in places from 60 to 70 feet; average for the pond about 32 feet; bottom mostly sand, with small rocks. The watershed is from three to four square miles in extent; five sevenths woodland, two sevenths pasture; only one family inhabits the watershed. This is a gravity system, with between five and six miles of cast-iron mains and galvanized and wrought iron service pipes. Practically the entire population is supplied from this system.

Chemical Examination of Water from Public Fountain.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
842	1902 Oct. 9	None	None	S. musty	0.0	3.90	1.40	.0000	.0068	.0000	.0000	.07	1.3	....	..
1659	1903 Nov. 9	Slight	Fine	S. veg.	0.0	2.90	1.40	.0010	.0056	.0000	.0000	.08	1.4	....	..
2186	1904 July 5	None	S. fine	V. slight	0.1	2.30	.80	.0000	.0062	.0000	.0000	.15	0.9	....	..
2711	1905 Feb. 21	Slight	Slight	Slight	0.00	3.6	1.8	.0000	.0014	.0500	.0000	.00	0.6	....	*a*
3234	Oct. 17	None	Slight	Veg.	0.10	2.5	2.5	.0008	.0090	.0100	.0000	.07	0.4	....	..
3506	1906 Mar. 6	None	None	S. veg.	0.10	3.5	1.8	.0014	.0074	.0050	.0000	.15	0.7	....	..
3868	Aug. 20	None	None	None	0.10	2.9	1.2	.0022	.0000	.0050	.0000	.07	0.4	....	..
4578	1907 May 29	None	V. slight	None	0.05	4.1	1.8	.0006	.0064	.0100	.0000	.14	0.4	....	..
5230	Apr. 13	None	V. slight	V. mark. veg.	0.25	2.0	.6	.0002	.0074	.0040	.0000	.08	0.4	....	..

a From public fountain.

Chemical Examination of Water from Well of the Camp Ossipee Association.

4805	1907 Aug. 12	V. S. op.	V. slight	S. foul	0.05	.....	....	.0150+	.0010	.0050	Tr.	.18	3.9	....	..
5538	1908 Aug. 21	V. S. op.	Slight	Slight	0.05	8.9	7.4	High	.0012	.0040	.0000	.08	3.2	....	..

Chemical Examination of Water Taken from Lake Winnipesaukee near Camp Ossipee.

4806	1907 Aug. 11	None	Slight	None	0.00	.....	....	.0014	.0054	.0050	.0000	.05	1.1	....	..

Woodstock—In 1897 the North Woodstock Water Company installed a system of water works which was sold to the town of Woodstock. This is in the precinct of North Woodstock. The source is a stream dammed to form a reservoir of about one acre. Seventy families, 99 per cent. in the precinct, are takers. There are no wells in the precinct. The town of Woodstock is about evenly divided into the northern and southern portion. The latter is supplied with water from private wells and springs, and since the removal of all lead pipe, etc., it seems to be of good quality.

Chemical Examination of Water from Supply of the North Woodstock Water Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
2215	1904 July 29	V. slight	V. slight	None	0.7	5.90	1.40	.0010	.0080	.0000	.0000	.05	0.7	...	...
3889	1906 Aug. 22	Gel.		None	Veg.	0.50	.....	.0010	.0080	.0050	.0000	.05	0.4	...	...
4438	1907 Apr. 16	None	None	Sl. veg.	0.18	4.1	1.7	.0016	.0024	.0050	.0000	.05	0.9	...	...
4748	July 22	None	None	None	0.70	3.8	1.5	.0002	.0046	.0050	.0000	.15	0.4	...	...
5081	Dec. 16	None	None	None	0.20	2.8	2.1	.0006	.0026	.0150	.0000	.10	1.2	...	...

Chemical Examination of Water from Peaslee Brook, Proposed as Supply for the Village of Woodstock.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
4859	1907 Oct. 2	None	Slight	Slight	0.35	....	....	.0024	.0064	.0050	.0000	.05	0.4	...	*
4880	Oct. 16	V. slight	V. slight	None	0.50	2.8	0.9	.0014	.0090	.0050	.0000	.05	0.4	...	*b
4881	Oct. 16	None	V. slight	Sl. veg.	0.40	2.7	1.2	.0010	.0070	.0050	.0000	.05	0.4	...	c*
4882	Oct. 16	V. slight	V. slight	None	0.40	3.0	1.0	.0012	.0064	.0050	.0000	.06	0.4	...	*d

* B. Coli present; *b* one half mile above proposed site of reservoir; *c* at proposed site of reservoir; *d* below proposed site of reservoir.

WOODSVILLE (village in town of Haverhill).—Woodsville Fire District is supplied with water by the Woodsville Aqueduct Company, whose plant was installed in 1885 by James Gordon, who introduced water from Gordon spring in 1892 or 1893. The first-named supply is from Ammonoosuc River, which receives all the sewage from the towns of Bath, Lisbon and Littleton, farther up the river. The water is pumped directly from the river, and flows through about three miles of iron distributing mains.

This company also supplies water from a spring, dug about four feet deep, which yields about 50,000 gallons daily, delivered through two miles of lead pipe. Soil is mucky loam with sandy bottom. About nine tenths of the population are supplied from these sources.

Gordon spring is about two feet deep, while the volume of water is about 48,000 gallons daily; soil, mucky loam with sandy bottom. One half mile of galvanized iron pipe is used to convey this water. Thirty-three families take from this supply.

Chemical Examination of Water Supply of Grafton County Almshouse.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
2568	1904 Nov. 30	Slight	Consid.	Peculiar	0.0	6.2	5.0	.0000	.0014	.0000	.0000	.20	4.5	...	*a
2585	Dec. 12	Slight	Consid.	None	0.10	8.5	6.0	.0000	.0000	.0300	.0000	.07	3.1	...	b
2586	Dec. 12	None	Consid.	None	0.0	7.6	4.0	.0000	.0000	.0200	.0001	.12	3.7	...	a

* B. Coli present; *a* spring; *b* well.

Chemical Examination of Water from Supply of Woodsville Aqueduct Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
17	1901 June 3	None	Con. floc.	S. veg.	0.1	3.60	1.20	.0014	.0057	.0066	.0000	.13	....	...	...
81	June 3	None	Much floc.	S. veg.	0.1	4.10	1.70	.0046	.0093	.0066	.0000	.13	....	...	...
19	June 3	None	Slight	S. veg.	0.1	3.70	2.20	.0004	.0057	.0066	.0000	.13	....	...	...
57	July 9	None	Floc. veg.	Dec.veg.	0.12	5.00	2.00	.0009	.0104	.0050	.0002	.26	2.0	...	...
58	July 9	None	None	Veg.	0.10	4.70	2.10	.0032	.0104	.0050	.0002	.20	....	...	...
59	July 9	None	Much floc. veg.	Dec.veg.	0.12	4.70	2.20	.0032	.0135	.0050	.0002	.20	.. .	...	...
159	Sept. 12	None	None	Dec.veg.	0.15	5.10	3.30	.0016	.0112	.0000	.0000	.19	....	...	...
160	Sept. 12	None	Floc. veg.	Dec.veg.	0.15	5.60	2.60	.0026	.0126	.0000	.0000	.19	....	...	...
404	1902 Feb. 18	None	V. slight	Veg.	0.1	5.80	3.40	.0006	.0070	.0200	.0000	.10	1.6	...	...
1022	1903 Feb. 2	None	None	S. veg.	0.2	4.30	1.90	.0000	.0048	.0200	.0000	.08	1.9	...	...
1023	Feb. 2	None	None	None	0.0	7.30	3.10	.0000	.0014	.0200	.0000	.12	2.9	...	...
1430	Aug. 11	Marked	Much fine veg.	V. slight	0.15	6.60	3.40	.0010	.0074	.0000	.0000	.15	1.8	...	...
1749	Dec. 18	None	Slight	None	0.0	6.20	4.30	.0004	.0048	.0400	.0002	.13	2.6	...	...
2117	1904 July 4	Slight	Con. floc.	M. veg.	0.2	4.10	2.30	.0108	.0082	.0000	.0000	.15	1.8	...	...
2723	1905 Feb. 25	None	Consid.	V. slight	0.10	5.7	4.0	.0020	.0000	.0200	.0000	.20	1.8	...	...
2811	Apr. 24	None	Slight	None	0.10	7.7	4.6	.0000	.0014	.0050	.0000	.10	2.6	...	*a
2851	May 17	Marked	Slight	None	0.10	6.6	4.0	.0000	.0000	.0150	.0000	.10	2.6	...	a
3499	1906 Mar. 5	None	Consid.	None	0.15	4.0	3.2	.0000	.0080	.0100	.0001	.05	1.5	...	*
4191	Nov. 28	None	V. slight	None	0.05	5.0	3.8	.0010	.0020	.1000	.0000	...	3.4	.08	a
4936	1907 Oct. 8	None	Slight	None	0.69	5.5	3.0	.0002	.0066	.0040	.0000	.08	1.6	...	...
5073	Dec. 13	Slight	V. slight	Sl. veg.	0.50	5.0	2.8	.0010	.0110	.0100	.0000	.08	1.9	...	...

* B. Coli present; *a* Child's Brook, proposed supply.

Chemical Examination of Water from a Driven Well Owned by the Boston & Maine Railroad.

5542	1907 Aug. 24	V. slight	Mod. earthy	Slight	0.05	.....	....	.0076	.0014	.2000	.0006	1.07	12.4	...	...

SPECIAL REPORTS ON WATER SUPPLIES.

LEBANON WATER WORKS.

The following graduation thesis given before the board of overseers of the Thayer School of Civil Engineering at Dartmouth College by Arthur John Ela, B. S., will be found to be an interesting description of the Lebanon Water Works, especially that part explaining the filtration plant:

Up to 1887 the village precinct of Lebanon, then with a population of about three thousand, was supplied with water only by private wells and an extremely inadequate semi-public aqueduct system of spring water brought from the surrounding hills, and of an amount limited to the needs of only about ninety families. In this year (1887), after a very destructive fire in the manufacturing section of the town, it was voted to put in a municipal supply and the necessary funds were obtained by bonding the precinct. A pumping station was erected on the Mascoma River above the town and water was pumped through a distance of 1,900 feet with 250 feet lift to a distributing reservoir of 1,000,000 gallons capacity, built mostly in solid rock, on top of a hill three quarters of a mile southeast of the center of the town.

The pump first used was of a type almost obsolete today; it had three pistons 120° apart (Lang, Goodhue & Co., Burlington, Vt., makers), and was driven by water power obtained through a canal of some 1,000 feet length.

At first water was pumped directly from the canal leading from the river. The source of the river is Mascoma Lake, a body of water five miles long by one and one half wide, three miles above the pumping station. The capacity of this lake has been considerably increased by a dam at East Lebanon, built by an association of mill owners in order to obtain a more uniform flow of water for power purposes. This lake is the main storage reservoir to which a catchment area of 148 square miles is tributary and even in the driest seasons it provides an ample storage capacity for precinct uses.

During the first few years after the installation of the system the water was repeatedly tested, and was always reported as excellent; but after a time, owing to the greatly increased pollution, principally from the increased mill wastes at Enfield, it was thought necessary, in 1894, to take some steps toward purifying the water by filtering or otherwise. Accordingly

in 1896, after considerable investigation, a well was dug near the canal from which water was to be pumped, and it was expected that in passing through the few feet of soil between the canal and the well the water would be purified sufficiently. This method shortly proved to give water of an unsatisfactory quality, and in 1898 a gravity system similar in general plan to that just previously built at Hanover was considered, using the head waters of Great Brook, with a storage basin near East Plainfield. This source of supply was abandoned because of the great expense involved and because of the uncertainty as to its being free from sewage pollution.

In 1901, with hopes of improving the quality of its supply, two covered filter galleries were built near the canal, one, rectangular, 30′ x 65′ x 15′, the other, circular, 8′ in diameter and 11′ in depth. The rectangular gallery was walled with stone to a thickness of three feet. The covering was made of steel beams, spaced six feet apart, supported by brick piers; the spaces between the piers were filled in with brick arches and all was covered with earth to a depth of three feet. From the two galleries 150,000 gallons per day of rather unsatisfactory water was obtained, which comprised the main part of the amount required, water being taken directly from the river only in case of fire.

In September, 1904, attention was called to the immediate necessity for a better quality of water than that obtained from the filter galleries; periodic analyses of the water from the pumping station by the State Board of Health gave evidences of sewage pollution in the form of colon bacilli in dangerous proportions, and the authorities at Lebanon were accordingly advised. Thereupon, three artesian wells were bored with a combined depth of 712 feet, but as all these evidently tapped the same vein and yielded but 20,000 gallons a day, and as the last one of the three had not increased the yield, some further supply was imperative. The "Great Brook" plan was again considered, but because of the expense involved (about sixty thousand dollars, as determined by Messrs. Everett and Smith of last year's class, not including the cost of the area drained), it was finally abandoned in favor of mechanical filters, which were duly installed and are in present use.

MECHANICAL FILTERS.

These filters are two in number and of the gravity type, built by The New York Continental Jewell Filtration Company; they have a possible combined capacity of 1,000,000 gallons per twenty-four hours. Each filter consists of a circular wooden tank, 15 feet in diameter, resembling a large barrel set on end. This tank contains the filtering material sup-

ported upon small spheroidal strainers screwed into collecting pipes at the bottom. Outside this tank, and with an open space between the two, is another of similar form and material, one foot greater in diameter and two feet greater in height.

The filtering material consists of four inches of $\frac{3}{8}$ to $\frac{3}{4}$ inch gravel at the bottom; next, another four inches of $\frac{1}{8}$ to $\frac{3}{4}$ inch gravel; and then 28 inches of moderately fine "quartz" sand of 20 to 40 mesh.

One of the distinctive features of mechanical filtration is the process of coagulation, and so essential is it that a brief description of the process will be given. Roughly considered, coagulation is produced by the introduction into the raw water of a soluble chemical salt, capable of disintegrating and becoming insoluble when brought into contact with certain constant constituents of the water itself. The result is the formation of an insoluble gelatinous coagulum of greater bulk and relatively greater specific gravity than is possessed by the impurities contained in the water. This coagulum is precipitated and gradually aggregating together, settles throughout the water, enveloping and dragging down such suspended matter as it comes in contact with and at the same time reduces the color. The filter bed of sand offers so much more resistance to the coagulum than it offers to the impurities as originally contained in the water that only a very small part of the coagulum with its entangled suspended matter finds its way down through the sand and gravel to the collecting pipes. A very common example of the work accomplished by a coagulum is that furnished by the practice of clarifying coffee by means of the white of an egg.

In the filters at Lebanon sulphate of alumina is used for the coagulent. It has been found from analyses of the water that there is sufficient alkalinity to neutralize $1\frac{3}{4}$ grains of the sulphate to the gallon of water; yet only one grain per gallon is used, and this proportion has proven entirely satisfactory.

The water is taken from the canal and treated with the sulphate about seventy-five feet before it reaches the filter; it then enters the outer tank of the filter, flows up through the open space between the tanks and over the circular rim of the inner one, covering the surface of the sand to the depth of a foot. Thence under the influence of gravity, it goes downward through the sand and gravel to the strainers and collecting pipes. The collecting pipes carry the filtered water to the large underground filter gallery (30′ x 63′ x 15′), before mentioned, whence it is pumped to the distributing reservoir on the hill. The term mechanical as applied to filtration does not mean, as is ofttimes thought, that the process of filtration is chiefly mechanical or that it differs essentially from sand filtration,

but it refers to the mechanical nature of the appliances used to clean the sand. When the filters become clogged through the accumulation of sediment on the surface of the sand, it is cleaned by an operation nearly the reverse of filtering; the water from the canal is shut off and water from the reservoir, under a head of 250 feet, is let into the collecting pipes at the bottom of the tank and forces its way up through the sand, thoroughly cleaning it and carrying the sediment back over the edge into a pipe discharging into the river. Revolving rakes, operated by a water motor, agitate the sand and facilitate the cleaning of it. The interval between washings averages twenty-four hours, and the operation requires fifteen or twenty minutes.

The color and turbidity efficiences of this filter are nearly one hundred per cent.; the bacterial efficiency is said to be 96 to $99\frac{8}{10}$ per cent.—results as good as it is practicable to obtain by any method now known. The cost of the coagulent for the amount of water treated is 35 to 40 cents a day.

It is inevitable in works of this kind (considering the system as a whole) that certain deficiencies in the equipment will appear from time to time, and this is particularly true in cases where great reliance is placed upon mechanical appliances; the necessary wear and tear must always be reckoned with. So in this case, considerable trouble and expense have been occasioned at different times by the equipment as originally installed, and much of it has been supplemented or replaced. From the first the triple-piston pump never proved very efficient under so great a lift as 250 feet, and it frequently needed repairing; it was supplemented in 1898 by one of the two-piston type (Laidlaw-Dunn-Gordon, Cincinnati, makers), with a capacity of 28 gallons per stroke, 26 strokes per minute, or a daily capacity of 1,000,000 gallons. The reservoir was lined and a low partition wall put in. The pumping station was found to have been built on quicksand, and twice was nearly wrecked by undermining; new foundations of stone were built. Owing to the friction while pumping, due to the small size of pipe, the line of eight-inch pipe from the pump to the reservoir is to be supplemented with another of ten-inch at an early date.

At the present time there are about four thousand water takers in the precinct; the daily consumption of water is 200,000 to 300,000 gallons, or 50 to 75 gallons per capita. The present system has a capacity of 1,000,000 gallons a day,—a capacity sufficient, except in case of a large conflagration or some other unforeseen trouble, to supply the demands of 12,000 people, —nearly three times the present population,—a number which probably will not be reached for many years.

PROTECTION OF THE WATERS OF LAKE WINNIPESAUKEE AND LAKE PAUGUS.

At the regular meeting of the State Board of Health, June 21, 1907, the following petition was presented:

The undersigned respectfully request that the State Board of Health of New Hampshire take immediate and necessary action to prevent pollution of Lakes Winnipesaukee and Paugus. That such rules and regulations may be established as will be necessary to prevent sewage from any farm house, cottage, hotel, boarding house, or other abode, from any boat when within one half mile of any public wharf or water intake, any privy or drainage from any stable or other building occupied by horses, cattle, swine, or other animals from entering said lakes, and the depositing therein of any animal or vegetable matter, or any vehicle containing or having contained the same. We would further suggest the enforcement of such rules after giving sufficient and reasonable time for all parties to make compliance with the same.

(Signed)

Name.	Name.
G. H. Saltmarsh (Dr.), Laconia.	Wm. A. Maclean (Prop. "The Colonial), Center Harbor.
Henry B. Quinby (Mfgr.), Laconia.	I. G. Lunt (Gen. Store), Center Harbor.
J. G. Quimby (Dr.), Laconia.	A. A. Bennett & Co. (Gen. Store), Center Harbor.
True E. Prescott (Ins. Agt.), Laconia.	J. S. Graves, Center Harbor.
H. Bickford (Mfgr.), Laconia.	James P. Leighton (Builder), Center Harbor.
A. H. Harriman (Dr.), Laconia.	L. B. Morrill (Dr.), Center Harbor.
C. S. Abbott (Dr.), Laconia.	J. W. Beede & Co., Meredith.
F. B. Easton (Dr.), Laconia.	S. M. Estes (Postmaster), Meredith.
J. A. Wrisley (Dr.), Laconia.	F. L. Hawkins (Dr.), Meredith.
A. W. Abbott (Dr.), Laconia.	C. S. Little (Dr.), Laconia.
A. J. LaFrance (Dr.), Laconia.	
C. W. Vaughan (Editor), Laconia.	
E. W. Smith (Selectman), Cen. Harbor.	

The following Rules and Regulations were promulgated:

THE STATE OF NEW HAMPSHIRE.

Whereas, A legal petition has been presented to the State Board of Health, asking for the establishment of regulations to protect the waters of Lake Winnipesaukee and Lake Paugus, under the provisions of Chapter 57, Laws of 1899, entitled "An act for the better protection of public water supplies," the following regulations are promulgated:

REGULATIONS OF THE STATE BOARD OF HEALTH FOR THE PROTECTION OF THE PURITY OF THE WATERS OF LAKE WINNIPESAUKEE AND LAKE PAUGUS.

1. No sewage from any town or village system of sewerage, or from any private sewer, or from any privy, stable or outbuilding, shall be allowed to enter Lakes Winnipesaukee or Paugus.

2. Nothing from any closet or toilet room upon any boat or structure of any kind shall be allowed to enter Winnipesaukee Lake within one half mile of any wharf or landing, or any public water intake.

3. Nothing from any closet or toilet room from any boat or structure of any kind shall be allowed to enter the waters of Lake Paugus.

4. No sewage or drainage of any kind from any public building or buildings, and no animal or vegetable matter, or vehicle containing or having contained the same, and no deleterious matter of any kind shall be deposited in the waters of said lakes, or upon the banks of said lakes where it may contaminate the waters of the same.

5. Any town or city bordering upon the said lakes shall construct such sewerage systems as may be necessary to relieve any village or congested sections so that the inhabitants thereof may comply with these regulations.

6. The local boards of health of towns and cities bordering on the shores of these lakes shall cause printed copies of these regulations to be posted conspicuously in different parts of the said towns and cities, and also cause them to be published in such newspapers as are issued in the said towns and cities bordering on said lakes, and they shall take such other measures as may be deemed necessary to advise all owners or occupiers of estates, the drainage from which may enter said lakes, and all owners of boats upon said lakes, so that full notice of the provisions of these regulations shall be had by individuals and the public before the date on which they take effect.

7. It is the duty of the local boards of health of such towns and cities as border on the said lakes to enforce these regulations.

8. The foregoing regulations shall not in any manner affect the rules and regulations of the State Board of Health for the protection of the waters of Alton Bay promulgated July 17, 1906.

9. These regulations shall take effect and be in force on and after January 1, 1909.

I hereby certify that the foregoing rules and regulations were adopted at a regular meeting of the State Board of Health held at the State House, Concord, this twenty-first day of June, 1907.

IRVING A. WATSON,
Secretary.

NOTE. The foregoing rules and regulations embrace, specifically and exactly, the conditions imposed by an act which passed both branches of the Legislature of 1907, but which failed to become a law on account of its being recalled from the Secretary of State, for the purpose of a slight amendment, too late in the session to be considered.

Upon this bill several hearings were held, at which interested parties appeared, in person and by counsel, so that all phases of the subject affecting public and private interests were considered, and the measure agreed upon was a compromise which removed substantially the objections which were raised against the original bill. The State Board of Health, in consideration of the facts, has deemed it wise to adopt the provisions of that bill.

PROTECTION OF THE WATERS OF ASQUAM LAKES.

At the regular meeting of the State Board of Health, held October 16, 1906, the following petition was presented:

To the State Board of Health of the State of New Hampshire:

Respectfully represent the undersigned that they have reason to believe that the body of water known as Little Squam Lake and Big Squam Lake, situate in the towns of Ashland, Holderness, Sandwich, Moultonborough and Center Harbor, in said state, and being a public water and ice supply for citizens and residents in said towns and others, is being contaminated and is in danger of further contamination and that by reason of the location of said lakes in several towns, and for other reasons, the local regulations are not sufficient or effective to prevent such pollution.

Wherefore your petitioners pray that your honorable board will investigate the case and establish such regulations as your board may deem necessary for the protection of said water and ice supply against any pollution that in the judgment of your board would endanger the public health.

(Signed)

(DR.) J. M. CHENEY,
E. P. WARNER,
ORA A. BROWN,
Ashland Board of Health.

J. H. EVANS,
C. G. BURLEIGH,
LAWRENCE J. WEBSTER,
Holderness Board of Health.

(DR.) A. B. HOAG,
F. E. BRYAR,
Sandwich Board of Health.

F. S. LOVERING,
GEO. H. RICHARDSON,
Moultonborough Board of Health.

(DR.) L. B. MORRILL,
F. R. GAMMON,
Center Harbor Board of Health.

September 1, 1906.

The secretary, having some doubts as to the authority of the board under the Public Statutes to comply with the request embodied in the petition, submitted the matter to the attorney-general, as follows:

CONCORD, N. H., September 6, 1906.

Hon. E. G. Eastman, Attorney-General, Exeter, N. H.

DEAR SIR: We submit herewith a petition which has been presented to the State Board of Health, and upon which we desire your opinion as to whether or not under the provisions of chapter 57, Laws of 1899, the State Board of Health has authority to establish regulations as asked for in the petition.

Respectfully yours,

(Signed) IRVING A. WATSON,
Secretary.

CONCORD, N. H., September 8, 1906.

Dr. Irving A. Watson.

MY DEAR SIR: Your favor, together with a petition in relation to the waters of Squam lakes, is received. It is my opinion that section 1, of chapter 57, Laws of 1899, is broad enough to cover this case. The act is general in its title and provisions, and the situation, according to the petition, is such as to demand immediate attention.

Respectfully yours,

(Signed) EDWIN G. EASTMAN,
Attorney-General.

The following Rules and Regulations were promulgated:

THE STATE OF NEW HAMPSHIRE.

Whereas, A legal petition has been presented to the State Board of Health, asking for the establishment of regulations to protect the purity of the water of Little Squam Lake and Big Squam Lake, under the provisions of Chapter 57, Laws 1899, entitled "An Act for the Protection of Public Water Supplies," the following regulations are promulgated:

REGULATIONS OF THE STATE BOARD OF HEALTH

FOR THE

PROTECTION OF THE PURITY OF THE WATER OF LITTLE SQUAM LAKE AND BIG SQUAM LAKE IN THE TOWNS OF ASHLAND, HOLDERNESS, SANDWICH, MOULTONBOROUGH AND CENTER HARBOR.

1. No privy, and no pig-pen, stable or other building or structure in which horses, cattle, swine, or other animals, or fowls are kept, shall be built or maintained within seventy-five feet of Little Squam Lake or Big Squam Lake (meaning high-water mark), or within seventy-five feet of any cove or inlet thereto, or within seventy-five feet of any stream tributary to said lakes, coves or inlets, except in such cases as the local board of health may permit, upon the approval of the State Board of Health, and under such regulations as they may require.

2. No sink-water, urine or water that has been used for washing or cleansing either materials, person or food, shall be allowed to run into said lakes, or into any cove or inlet thereof, or into any stream tributary thereto, or into any excavation or cesspool in the ground, or on the surface of the ground within seventy-five feet of said lakes (meaning high-water mark), or of any cove or inlet, or

within seventy-five feet of any stream tributary thereto, except by consent and under such regulations and conditions as may be approved by the State Board of Health.

3. No dead animal or fish, or parts thereof, or food or any article perishable or decayable, and no dung, either human or animal, kitchen waste, swill or garbage shall be thrown into or deposited in said lakes, or left or permitted to remain within seventy-five feet thereof (meaning high-water mark), or into any cove or inlet of said lakes, or into any stream tributary thereto, or within seventy-five feet of such cove or inlet, stream or tributary.

4. No sawdust shall be thrown or be allowed to fall into said lakes, or into any stream tributary thereto.

5. No person shall bathe in said lakes within one-fourth mile of where water is taken for a public supply, or within like distance to any private intake pipe. provided notice to that effect is conspicuously posted in the vicinity.

6. No boat, either for public or private use, nor houseboat, nor other construction for use on said lakes shall have, keep or maintain a ship-closet, urinal or other construction of easement which shall permit excrement or other offal to fall or empty into said lakes or any stream tributary thereto.

7. No matter, waste or materials such as are described in sections 2, 3 and 4 shall be thrown, deposited or allowed to remain upon the ice of the waters of said lakes, or upon that of any cove or inlet thereof, or of any stream tributary thereto.

8. It is the duty of the local board of health of the several towns named to enforce these regulations, and for the violation of any regulation established by the State Board of Health adequate punishment is provided by law.

9. The foregoing rules and regulations will take effect and be in force on and after June 1, 1907.

I hereby certify that the foregoing rules and regulations were adopted at a meeting of the State Board of Health held at the State House, Concord, this sixteenth day of October, 1906.

IRVING A. WATSON,
Secretary.

HILLSBOROUGH BRIDGE WATER SUPPLY.

At the regular meeting of the State Board of Health, June 21, 1907, the following petition was presented:

To the Hon. State Board of Health, Concord, N. H.:

GENTLEMEN: Since recent samples of water taken from our water system show the presence of "Colon Bacilli" under examinations made by the State Board of Health; and, whereas, the condition of the shores surrounding the source of our water supply at "Loon Lake," so called, is apparently accountable for the present poor quality of the water therefrom; we, the Board of Water Commissioners in the Hillsborough Bridge Village Fire Precinct, and Local Board of Health (and town of Hillsborough) respectfully petition the State Board of Health to act immediately, under Chapter 57, Sections 1, 2 and 3, of the Public Statutes of the State of New Hampshire, and prescribe such rules and regulations for the protection of the health of the public as is customary in such cases, and compel owners of hotels and cottages on the shores of Loon Lake to properly care for their sewers, closets and outhouses, as well as of fluids from their sink drains, or recommend whatever action in their opinion seems necessary.

(Signed)

CHARLES A. JONES,
STILLMAN H. BAKER,
GEORGE E. WYMAN,
Board of Water Commissioners.

WILLIAM O. STORY,
WARREN P. GRIMES,
LEON E. ANNIS,
Board of Health.

The following Rules and Regulations were promulgated:

THE STATE OF NEW HAMPSHIRE.

Whereas, A legal petition having been presented to the State Board of Health, asking for the establishment of regulations to protect the purity of the water of Loon Lake, Hillsborough, under the provisions of Chapter 57, Laws of 1899, entitled "An act for the better protection of public water supplies," the following regulations are promulgated:

REGULATIONS OF THE STATE BOARD OF HEALTH
FOR THE
PROTECTION OF THE PURITY OF THE WATER IN LOON LAKE
IN THE TOWN OF HILLSBOROUGH.

1. No privy, pig-pen, stable, or other building or structure in which horses, cattle, swine, or other animals or fowls are kept, shall be built, continued or

maintained within seventy-five feet of Loon Lake (meaning high water mark), or within seventy-five feet of any bay, cove, or inlet thereto, or within seventy-five feet of any stream tributary to said lake, bays, coves, or inlets, except in such cases as the local board of health may permit, upon the approval of the State Board of Health.

2. No sink water, urine, or water that has been used for washing or cleansing either materials, person, or food, shall be allowed to run into said lake, or into any bay, cove, or inlet thereof, or into any stream tributary thereto, or into any excavation or cesspool in the ground or on the surface of any ground within seventy-five feet of said lake (meaning high water mark), or of any bay, cove, or inlet, or within seventy-five feet of any stream tributary thereto, except by consent, and under such regulations and conditions as may be given by the local board of health, upon approval of the State Board of Health.

3. No dead animal, or fish, or parts thereof, or food, or any article perishable or decayable, and no dung either human or animal, kitchen waste, swill, or garbage shall be thrown into or deposited in said lake, or left or permitted to remain within seventy-five feet thereof (meaning high water mark), or into any bay, cove, or inlet of said lake, or into any stream tributary thereto, or within seventy-five feet of such bay, cove, or inlet, stream or tributary.

4. No person shall bathe in said Loon Lake within one-fourth mile of the point where the water is taken for public supply (Sect. 4, Chapter 76, Laws of 1895), or elsewhere in said lake, provided notice to that effect is issued by the Board of Water Commissioners or the Board of Health.

5. No sewage shall be deposited on the surface of the ground, and no cesspool or privy vault shall be allowed to overflow, and none of the things, materials or conditions mentioned in the foregoing regulations, nor anything else that might endanger the purity of the said water supply shall be permitted to exist, whatever may be their distance from said pond, in such locality or manner as in the opinion of the Board of Health, or of the Board of Water Commissioners, would be liable to contaminate the water of the said pond.

6. The Board of Water Commissioners is authorized to make reasonable rules and regulations to govern the manner and place of cutting and taking ice on said pond as they may deem necessary to prevent the contamination of the water or ice supply. (Sect. 2, Chapter 76, Laws of 1895.)

7. The Board of Water Commissioners may make reasonable rules and regulations in regard to the use of boats, and of racing or speeding horses upon the ice of said lake, as they may deem expedient. (Sect. 3, Chapter 76, Laws of 1895.)

It is the duty of the local board of health to enforce the above regulations, and any person violating any regulation established by the State Board of Health for the protection of the water supply is liable to a fine of twenty dollars for each offense. (Sect. 2, Chapter 57, Laws of 1899.)

I hereby certify that the foregoing rules and regulations were adopted at a regular meeting of the State Board of Health held at the State House, Concord, this twenty-first day of June, 1907.

IRVING A. WATSON,
Secretary.

INSPECTION OF SUNCOOK'S WATER SUPPLY.

During September, 1908, at the request of the local board of health an inspection was made of the supply of the Suncook Water Company. The report follows:

Dr. Irving A. Watson, Secretary State Board of Health.

DEAR SIR: I desire to submit to you a report of an inspection made by me September 14, 1908, of the supply of the Suncook Water Company. Dr. C. B. Abbott, of the local board of health, called upon me September 12, bringing a small sample of the water as drawn from the tap on that date. This sample was highly colored, repulsive in appearance and showed an offensive odor. It was represented that during the three days preceding that date there had been much complaint throughout the village over the quality of the water, and it was alleged that a number of fish had passed the service pipes and been found responsible for the clogging of taps located on the "dead ends."

On my arrival, September 14, the water was found to be very much improved —its condition, in fact, being practically normal. An inspection of the reservoir and surroundings was made, the local members of the party consisting of Dr. C. B. Abbott and Mr. F. M. Millard of the board of health and Supt. C. E. Dalton and Messrs. Head, Miller and Weeks of the Water Company. This reservoir is located about five miles east of the village and is formed by the damming of Boat Meadow Brook at a point about three miles below where it flows from Bear Hill Pond. The latter is of several acres' extent, is said to be fed almost entirely by springs and has a sandy and rocky bottom. The flow of the brook is regulated by a gate at the pond and there are neither habitations nor pastures on its water-shed.

The upper end of the reservoir, into which the brook flows abruptly, consists of a swamp which is the natural result of the flowage of this area without any apparent attempt to remove the growth with which it was covered. The result is a mass of decaying tree-stumps standing in dark, stagnant or semi-stagnant water that is supporting a luxurious growth of lilies and other aquatic plants, including many fungi. In an attempt to improve this condition a channel or canal, 600 to 800 feet long, has been constructed through the middle of the reservoir to a point about 100 feet from the dam, the side and end walls consisting of rock-paved earth. The swampy area on either side of the canal is connected by underlying drain pipe, and there is an overflow at one side designed to prevent flooding of the canal and to some extent, stagnation, although as the water has to reach a certain height before it wastes, probably not much is gained in this connection.

Properly speaking there are two dams. Above the upper a "sand leach" has been constructed, consisting of about eight courses, each of 60 feet, of loose

jointed Akron tile, so covered with coarse and crushed rock and sand as to form a kind of filter. After having seeped into the tile the water is conveyed under the dam into the smaller reservoir, or intake chamber, thence into the mains after passing a double copper screen of fine mesh.

For some time the supply of the Suncook Water Company has shown a considerably higher color than that of any other public supply in this state. Some of this color is attributable to the leaching of decaying wood and plant materials in the reservoir, especially at the upper part. While the canal through the latter undoubtedly helps matters somewhat, yet there can be no question that there is a certain amount of seepage through the porous walls, and during wet conditions the canal walls must be overflowed, with a resulting mingling of the water. But an examination of a sample taken from the brook at the point of entering the canal serves to indicate that much of the color exhibited by this supply is apparently attributable to the leaching out of decaying leaf-mould during the flow from the pond, such flow being very slight in volume during much of the year.

Water of this character is usually quite stable, and but little apt, on standing, to develop odors or tastes. I am, therefore, inclined to believe that the trouble of the past week is properly attributable, very largely, if not wholly, to the decomposition of fish within the mains. The superintendent states that he had been gradually flushing out the mains for several days, and this of course was the immediate cause of the disturbance. Just how the fish gained entry is not wholly apparent, but the most plausible theory seems to be that this occurred when resort was had, during a period last spring, to a small auxiliary spring supply known to contain many fish, and which was not screened before entering the mains.

The only remedy for avoiding the excessive color of this supply is a radical one, involving the extension of the mains to the pond; it has been represented that direct draught from the pond is not thus practicable because of the head that would result. While high color in a water supply is always to be deplored and ought not to be tolerated if there are any feasible means for its elimination, nevertheless it is universally recognized that such waters are very generally free from any noxious or deleterious properties. That such is true in the present instance is borne out by the testimony of the local board of health.

The only recommendation, therefore, that could be made, not involving improvements of a decidedly radical nature, was the suggestion that the mains be flushed out two or three times a year, preceded by proper notice to the public of this act. The condition of the shores of the reservoir in the vicinity of the dam might also be improved with advantage by removal as far as possible of all débris and decaying matters. A further improvement would be in the removal from the surface of the sand "filter" of the eight years' accumulation of mud. While the draining of the reservoir might prove a little awkward on account of the temporary loss of fire protection, nevertheless it ought to be possible to effect some kind of an arrangement whereby this could be done.

Respectfully submitted,

C. D. HOWARD,

Chemist.

REPORT ON DURHAM WATER SUPPLY.

Dr. Irving A. Watson, Secretary of State Board of Health.

DEAR SIR: At your request I visited Durham, December 7, 1906, for the purpose of gaining information concerning the character of the water supply at present available to students of New Hampshire College.

I was met by Professor Morse and Hon. Lucien Thompson of the board of health, and by President Gibbs of the college, who explained the situation to me in detail. In reply to a request for information concerning the recently reported outbreak of typhoid fever among the students, as a result of the alleged poor quality of the water supply, it was stated that but two students had recently been sick with any illness simulating typhoid fever; that one of these had returned to the college within a week of his departure for home on account of such illness, and that it had been satisfactorily demonstrated that the second case was a false one. Moreover, I was informed that, with one exception—and this not a recent one—there has been no case of typhoid fever in Durham for a long period of years.

Thirteen sources of supply were inspected and an analysis of the water of each subsequently made. These include wells and springs located in various parts of the village, the water of which is used by the students to a greater or less extent for drinking purposes. This number does not include the college reservoir water, which is pumped to a tank in Thompson Hall and used only for boiler, fire protection and cleaning purposes—the amount of dissolved vegetable matter rendering it unsuited for drinking.

The water used at the majority of the college buildings (aside from dormitories and fraternity houses) is derived from a spring located just south of the Experiment Station and remote from polluting influences. The analysis (No. 4213, *p.* 45) shows this water to be of very satisfactory quality, free from organic matter or any evidence of pollution.

Conant Spring, so called, located in the rear of Conant Hall, is used to a limited extent as a supply. This spring is not far from a brook that carries some drainage, and, during wet seasons a certain amount of surface water doubtless reaches the spring from this source. The analysis of this water, made December 11, is not wholly favorable, and it would be well to dispense with the use of this supply altogether, in favor of that from the college spring, just mentioned.

The chief source of supply for students rooming in the immediate vicinity of the college is a series of four wells known as the Pettee system. These wells are scattered, but all are located along the edge of an extensive shallow ravine, or "run." These runs are characteristic of all this section, traversing Durham village as they do in all directions, and serving as channels for the conveyance of drainage material to tide-water.

The water of this supply is of variable character. Analysis No. 4223 is of water from a large new well, partially constructed of brick. Aside from the

high solid residue—which seems to be a characteristic of the waters emerging from the clayey soil of this locality—the only unfavorable feature is a trace of nitrites, and the latter may of course be due to some temporary abnormal condition. Possibly the most questionable well in the Pettee system is the lower one (Analysis No. 4215, *p.* 45), as, from my observations, this is exposed to some extent to polluting influences, the analysis also indicating a higher chlorine and nitrate content than in the other cases. However, I am of the opinion that all of these waters are safe and fit for use at the present time.

Analysis No. 4221 is of a well located close to DeMerritt Hall. This water shows a relatively high chlorine and nitrate content, and the sample taken December 10 cantained colon bacilli. This water should be boiled before using for drinking purposes.

The Charles Hoitt well, so called, located nearer the center of the village, supplies water to one of the dormitories, and also to a number of residences and to the restaurant in the post-office building. This water is apparently of excellent quality. At the restaurant mentioned, another source of supply alleged to be used to some extent when the Hoitt well is low, is a nearby well situated close to the street. An analysis of this water in April, 1905, showed this well to be but little better than a receptacle for filtered sewage. It would seem desirable that this well be permanently closed by the board of health.

The analysis of the Bickford well water (No. 4216) indicates a poor condition. However, I am informed that this water is not used by students to any extent at present.

Analyses Nos. 4217 and 4222 represent the J. W. Burnham supply. These wells are located at the lower extremity of the village and the water is doubtless not much used by students. Sample No. 4222 was from the well located on the edge (and partially in) the mill pond on the Oyster River. This pond receives a large proportion of the sewage from the college buildings. The analysis indicates a polluted condition. The upper well (No. 4217) also does not give a favorable analysis; but in this case, use of the water is probably not attended by any great risk, as this water is well oxidized and filtered at present, and, also the drainage is of a somewhat different character, representing wash from fields and, to some extent, seepage from the stable located some distance above.

With the growth of the college and the present extensive introduction of modern plumbing systems into residences, the time is rapidly approaching when a system of sewage disposal will be absolutely necessary. And, until this is secured, that a considerable proportion of the water supplies of Durham will be exposed to the danger of pollution is inevitable.

Respectfully submitted,

C. D. HOWARD,

Chemist.

DECEMBER 19, 1906.

HANCOCK WATER SUPPLY.

After a somewhat spirited contest before the legislature on the question of obtaining a charter for a public water supply for the town of Hancock, the following was enacted:

AN ACT AUTHORIZING THE TOWN OF HANCOCK TO CONSTRUCT AND MAINTAIN WATER WORKS.

Be it Enacted by the Senate and House of Representatives in General Court Convened:

SECTION 1. That the Town of Hancock, in the County of Hillsborough, is hereby authorized and empowered to construct, manage, maintain and own suitable water works, for the purpose of introducing into and distributing through the villages in said town, or any part of said town, an adequate supply of pure water, in subterranean pipes, for extinguishing fires and for the use of its citizens and others, and for such other public, private and mechanical purposes as said town may from time to time authorize and direct; and for that purpose may take, purchase and hold, in fee simple or otherwise, any real or personal estate, and any rights therein, and any waters and water rights, and do all other things necessary for carrying into effect the purposes of this act, and may excavate and dig canals and ditches in any street, place, square, passageway, highway, common, or other land or place, over or through which it may be deemed necessary and proper for constructing, maintaining and extending said water works, and may re-lay, change, enlarge, repair and extend the same at pleasure, having due regard for the safety and welfare of its citizens and security of the public travel.

SECT. 2. Said town is authorized and empowered to enter upon and take water from Eaton's Brook in said Town of Hancock, and to enter upon, take and appropriate any land, streams, ponds, lakes or water rights in the Town of Hancock, not belonging to any aqueduct company, and to secure by fence or otherwise, such land, streams, springs, ponds, lakes or water rights, and dig ditches and canals, make excavations or reservoirs, through, over, in or upon any land or inclosure through which it may be necessary for said excavation, said reservoirs or said water works to be or exist, for the purpose of obtaining, holding, preserving or conducting such water, and placing such pipes or other materials, or works as may be necessary for building and operating such aqueduct and water works, or for repairing the same; providing if it shall be necessary to enter upon and appropriate any land, stream, spring, pond, lake or water right, for the purposes aforesaid, or to raise or lower the level of such stream, spring, pond or water right by dams or otherwise, and if said town shall not agree with the owner or owners thereof for the damages that may be done by said town, or such owner or owners shall be unknown, said town, or said owner

or owners or party injured, may apply to the trial term of the Superior Court for the county within which such stream, spring, pond, water right, lake or land is situate to have the same laid out and damages determined, and said court shall refer the same to the county commissioners for said county, who shall appoint a time and place of hearing, and give notice thereof in the same manner as is now provided by law for laying out highways, and said commissioners shall make a report to said court, and said court may issue execution accordingly; if either party shall desire, they shall be entitled to a trial by jury, in such manner and under such regulations as the court may prescribe, in the same manner as appeals from the award of damages in the case of laying out of highways.

SECT. 3. Said town is authorized and empowered to contract with individuals and corporations, whether citizens of said town or not, for supplying them with water for any of the purposes herein named or contemplated, and to make such contracts and establish such regulations and tolls for the use of water for any of said purposes as may from time to time be deemed proper and necessary. For the more convenient management of said water works, the said town may place the construction, management, control and direction of said water works in a board of water commissioners, to consist of three citizens of said town, said commissioners to be vested with such powers and duties relating to the construction, control and management of the same as may from time to time be prescribed by said town.

SECT. 4. Said town is also authorized and empowered, at any annual or special meeting, by a major vote of those present and voting, to raise and appropriate, or to borrow or hire, such sums of money on the credit of the town as may from time to time be deemed necessary and expedient, for the purpose of defraying the expense of purchasing real estate, rights in real estate, water rights, streams, springs, ponds, lakes, and other rights and property, as aforesaid, and for constructing, maintaining, repairing, extending, enlarging and operating said water works, such indebtedness not to exceed at any one time twenty thousand dollars, and to issue notes or bonds of the town therefor, in such amounts and payable at such time or times and at such rates of interest as may be thought proper, and may exempt such notes or bonds from taxation when held by inhabitants of the town, said notes and bonds to be signed by at least a majority of the selectmen and countersigned by the town treasurer. Said town is hereby authorized and empowered to raise by taxation and pay each year the interest of the notes and bonds so issued, and such part of the principal as the town may determine at any annual meeting.

SECT. 5. The action of the town at the annual town meeting March 14th, 1905, in voting to appoint a committee to investigate the matter of a water system, and in appropriating money to defray the expense of such investigation, and the action of the town at the annual meeting March 13th, 1906, in electing a board of water commissioners, in voting to accept money subscribed by citizens toward the water system, in voting to establish said system, in voting to borrow for the construction of said water system the ten thousand dollars known as the Whitcomb legacy held by said town, said town paying thereon the same rate of interest now received on the same, and the action of said board of water commissioners in letting said contract, in accepting real estate and water rights given by citizens of said town for the establishment of said water

system, and all contracts and agreements heretofore made by said town or said board of water commissioners for the establishment of said water system, pursuant to the action of said town meetings held March 14th, 1905, and March 13th, 1906, are hereby ratified, confirmed and legalized.

SECT. 6. This act shall take effect upon its passage.

[Approved March 7, 1907.]

For a year or two previous to the enactment of the foregoing measure, the question of a public water supply had been agitated in that town; some action had been taken at the town meeting of 1905, by the appointment of a committee to investigate the matter, and, at a subsequent meeting, a board of water commissioners had been elected and some money appropriated, as will be seen by the legalizing of certain acts in Section 5 of the above-quoted law.

To assist the local board in arriving at a conclusion as to the best sources for the water supply, numerous analyses were made at the State Laboratory of Hygiene, some of which are shown in a previous report of this board.

Certain questions having arisen in relation to the quality of the proposed supply, the State Board of Health authorized Mr. C. D. Howard, chemist, State Laboratory of Hygiene, to make a physical examination of the proposed sources of the supply, in order to be better able to advise the local board what to do with certain conditions which confronted them. Numerous analyses of the water of Eaton Brook and its tributaries were made (see page 62). The following report was made:

To the Board of Health, Town of Hancock, New Hampshire.

GENTLEMEN: Relative to an inspection made by me, June 4, 1907, of a proposed water supply for the Town of Hancock, the following report is submitted:

The proposed supply consists of a stream, Eaton's Brook, so called, formed by the confluence of Anderson and Briggs Brooks, the latter having their origin in a range of hills several miles west of the village.

The site contemplated for the reservoir is a deep ravine between rocky wooded hillsides situated at a point about two miles west of the town. The brook is to be impounded by means of a dam 100 feet wide and it is the intention to remove the surface débris to the underlying rock. For about three fourths mile above the proposed reservoir site the course of Eaton's Brook is largely through a narrow strip of open meadow underlaid by a gray disintegrate quartz. This meadow, or intervale, extending through a water-shed for the most part wooded, is apparently well supplied with ground water from the adjacent hillsides, a series of several open ditches tributary to the brook serving to carry the water from a number of springs.

With the exception of the fact that a number of the samples of this water examined at the laboratory during the past two years have shown the presence of colon bacilli, the analyses have as a whole been favorable. As would be expected in the case of a stream draining largely from wooded hillsides, the

water shows some color and albuminoid ammonia (indicative of dissolved organic matter); neither of these constituents, however, can be considered as excessive, it being probable that when the system shall have been properly installed the color under normal conditions will not exceed 0.10 or 0.15 on the scale employed for its designation.

The inspection was made principally with the view of ascertaining the probable source or sources of pollution by colon bacilli, and in this connection samples were taken at six different points, viz.: (1) from Eaton's Brook above site of proposed dam, (2) ditch below Tudor place, so called, (3) spring just below barn on Tudor place, (4) point on Anderson's Brook just below Anderson barn, (5) source of Anderson's Brook, on hillside above highway, and (6) Briggs' Brook, on hillside just above highway. The results of the examinations will be reported later.

Located on the water shed north of the intervale are four sets of farm buildings. At the Tudor barn, it is represented, no cattle have been kept for two years, the only stock at present being two or three horses. One year ago the slope below the barn was heavily manured and it is possible that colon bacilli from this source enter Eaton's Brook by way of the drain ditch. A cesspool also connected with these buildings, though remote from the brook, yet might prove a possible source of pollution under abnormal conditions, such, *e. g.*, as an overflow on the surface when the latter is frozen, or at times of heavy rains. Under ordinary circumstances, however, and with reasonable care and precaution this feature need afford no ground for apprehension.

At the Anderson barn, located practically in the middle of the intervale, a serious condition exists. Here the brook not only laps the foundations of an old delapidated structure affording shelter for cattle and a quantity of stable manure, but it virtually flows through the barn yard. The proposition to move the channel at this point a few rods further south, evidently could not afford a complete remedy because of the fact that a certain amount of drainage from the barn in its present location must necessarily reach the brook at some point further down. The best procedure, in case it should not prove feasible to raze these buildings entirely, would be in removing the barn to a point two or three hundred feet nearer the highway and then restricting its use as shelter for cattle. In the case of none of the other four buildings, located on or above the highway, would it seem that there is any chance of danger therefrom.

Aside, then, from the conditions at the Anderson barn, the only other chance for contamination is in the application of stable manure to the slopes drained by these brooks. In addition to the case cited, it was noted that manure had been applied to one cultivated area located below the roadway and also to one at a point above the source of Anderson's Brook, as well as to another area above Briggs' Brook. It is evident that the practice of applying manure at any point on the water-shed is an undesirable one and if allowed at all should be restricted to such areas where there is no probability of pollution therefrom by surface wash entering the brook.

In conclusion it may be stated that this water is naturally of excellent quality. It should not be a difficult matter to eliminate or restrict the possible polluting factors, and if the precautions suggested are carried out there is apparently no reason why the supply should not prove a satisfactory one.

Respectfully submitted,

(Signed) C. D. HOWARD,

Chemist.

ADVICE TO THE VILLAGE PRECINCT OF NEW HAMPTON RELATIVE TO PROPOSED WATER SUPPLY.

During the spring of 1908, Prof. Robert Fletcher, civil engineer and member of the board, made examinations of several sources of water supply under consideration by the New Hampton Village Precinct. Three of these sources were reported upon adversely for various reasons. The following is that part of his report in reference to the Mountain Pond supply:

"The aneroid barometer indicated the altitude of this pond as about 600 feet above the village. The area appears to be probably 30 acres. A boat trip was made across this pond in various directions and soundings were taken under the guidance of F. W. Preston, principal of the New Hampton Literary Institution, who has ably conducted preliminary investigations. At one end the depths increased slowly to 5, 8, 12 and 20 feet or more. At the other end the depths increase suddenly from a steep rocky shore to 23 to 46 feet, and probably more, as that was the limit of the sounding line. Rocks are visible everywhere over the bottom, thus showing clean conditions. Near the outlet end a reef of rocks juts out from one side (under water) but leaves a sufficient main channel near the other side. The water was tasted and viewed in a drinking-cup, at two or three places and seems to be unexceptionable. Margins rocky or gravelly.

"Down along the brook-bed which formerly carried the overflow from this pond a proper site was found for a distributing reservoir for a suitable village supply. This is about 5,000 feet from the library building, and the water surface would have an elevation of 165 feet above the street at that point. This would give a water pressure of about 71 pounds per square inch. Such reservoir could be made by a dam 12 or 13 feet high in the middle and about 150 feet long on top but tapering up to quite a low dam at both ends. The water surface would probably cover nearly two acres. The proper material for such a dam is mostly on the spot and the area can be cleared readily and cheaply. Its capacity, by a rough guess, would be between two and two and one half million gallons, based on an average depth of 4¾ feet, with 10 feet depth behind the dam.

"The water supply needed by the village is determined by the necessary fire protection. This might demand a draft of 400 to 450 gallons per

minute. It would be unwise to put in a main pipe less than eight inches in diameter. Even in this the friction would cause a loss of 22½ feet of head in 5,000 feet. The additional loss through a thousand feet of six-inch pipe would be 17½ feet, and through 500 feet of four-inch pipe about 50 feet more, if four hundred gallons per minute were delivered. This is a total loss of 90 feet *at the lower end.* But the delivery would probably be reduced at the lower end, so that the loss of head might not be quite so much; but the loss in the hose pipe is yet to be added. These figures are given to show the reason for the size of main pipe proposed. Of course the house consumption would be such a small fraction of this amount that it need not be considered in this estimate. It is evident that so small a pipe as 4 inches for a street main is not advisable, owing to the great friction loss when a fire stream is needed. In the above case if 6-inch pipe were used instead of 4-inch the lost head would be only 10 feet instead of 50. The margin would supply the head needed for the hose pipe.

"In brief, this plan requires a considerably shorter pipe line, will afford a superabundant supply and is entirely feasible and sufficient.

"It is perhaps not absolutely necessary but quite desirable to make available the comparatively unlimited capacity or resources of the mountain pond thus: An outlet pipe put in at the nearer outlet and sunk two or three feet below the present full level would give full control of the storage above the intake end. A low dam three feet or more in height and a spillway dam at the other overflow would raise the pond level three or four feet at small cost and increase the storage by about ten million gallons for each foot of increase in depth. As the dry season of summer comes on, then the flow in the other tributary brooks becomes small, the discharge from this pond could be regulated so as to continually feed the proposed reservoir with pure water from this high altitude, and make sure the purity and freshness of the reservoir supply.

"This supply for a place like your village is practically unlimited, and that is an enormous advantage, because you could always maintain a continuous flow, and prevent any stagnation in the distributing reservoir."

CLAREMONT WATER SUPPLY.

During the season of 1908, the public water supply of Claremont got into a condition that rendered it objectionable to consumers on account of its odor and color, as well as from an apprehension that its use might produce serious results.

Numerous analyses were made at the State Laboratory of Hygiene, but, in order to obtain a clearer understanding of conditions, the chemist of the board was advised to make a local inspection and to report his findings to the board of health of Claremont, which he did as follows:

To the Board of Health, Claremont, N. H.

GENTLEMEN: I beg to submit the following report with recommendations as a result of an inspection made by me August 24, 1908, of the public water supply of Claremont:

This supply is derived principally from a mountain brook, the upper course of which is through an uninhabited, densely wooded tract. The water is impounded in a series of three reservoirs constructed along the lower course, the first and largest being located about two miles above the village. The flow to the smaller middle reservoir (three fourths of a mile) is controlled by a gate and is over an open watercourse. A comparatively small third reservoir one half mile nearer town, located on an adjacent watershed, is connected with the middle reservoir by a closed main. All of these reservoirs have been constructed across ravines, the watershed being for the most part quite abrupt and well defined.

A dam constructed a few rods above the upper extremity of the smallest (lowest) reservoir serves to prevent the entrance into the latter of any excess of water from showers or freshets, such excess being diverted through a 2-foot sewer tile. Back of this dam there is also a gate communicating by a pipe with the reservoir and designed to utilize, when necessary, the extra waste water that finds its way from the middle reservoir over the open watercourse. It is therefore evident that the only manner in which water accumulating in the watershed between the middle and lower reservoirs can enter the supply is (a) by reason of the gate mentioned being opened (which it is represented has not been done for twelve months) and (b) a greater volume of water accumulating behind the small dam mentioned than the waste will accommodate—a circumstance said to have been observed but once.

There is but one house on the lower watershed. Though nominally vacant, it was found that such is now occupied by parties at intervals during the summer. Attached to this house is an outside closet directly overhanging and practically draining into the brook. An agreement said to have been entered into to the effect that this closet should not be used, is apparently being disregarded.

The area between the middle and upper reservoirs is about equally divided

between open pasturage and a dense growth, the latter belonging to the town. The connecting brook under present conditions serves not only as a supply for the town but for a herd of cattle, members of which were observed standing directly in the channel.

The main (upper) reservoir is paved on its lower side, the lateral walls exposing a surface of heavy blue clay. A certain amount of silt therefrom is carried into the middle reservoir, augmented by a considerable amount of wash from the highway bordering the latter. As a result, this reservoir showed a somewhat extensive accumulation of mud, and the same condition was noticeable to a lesser extent in the case of the lower reservoir. The evidence is that this mud is also carried in some degree into the mains, where the accumulation tends to slowly decompose and give rise to the odors and taste complained of.

Past analyses have uniformly indicated a very fair quality for this supply. The last analysis (brook water only) was favorable in all respects except for the finding of colon bacilli, the latter being readily explainable through the presence of cattle, as referred to. Colon bacilli should not be confounded with typhoid bacilli; as long as we may feel confident that their source is not in the entrance of human sewage, the presence of a few of these intestinal bacteria derived as they are from pasture wash, is not a matter to excite any particular concern. I may state therefore that I do not consider the conditions alluded to as sufficient ground for any present alarm or apprehension as to the fitness of the supply for drinking purposes.

I am satisfied that much of the present concern was induced through the recent introduction into the mains of water from an auxiliary supply consisting of a dozen wells located on the bank of the Sugar River. Analysis shows that whereas this water is reasonably pure organically, any draught exerted on this supply results in an influx of iron, the latter settling out in the mains as a very objectionable although hygienically harmless sediment. On this account, and as this phenomenon is liable to continue indefinitely, it is doubtful if the supply represented by these wells can ever be utilized to any appreciable extent.

It is recommended:

1. That the two lower reservoirs be cleaned.
2. That the privy referred to be removed.
3. That the highway adjacent to the middle reservoir be so drained as to divert surface wash therefrom.
4. That the town's property in the neighborhood of the main reservoir be fenced so as to exclude the entrance of cattle from the highway.
5. That the pasture above the middle reservoir be acquired by the town. The remedy suggested of piping the flow from the upper to the middle reservoir as being possibly cheaper than the purchase of the necessary land, does not seem wholly adequate in that the contaminated drainage from the pastured watershed would continue to enter the latter reservoir, and moreover the total volume of the present supply would be reduced by the amount of such drainage thus lost.

Respectfully submitted,

C. D. HOWARD,
Chemist.

HAMPTON BEACH IMPROVEMENTS.

During the past few years the sanitary conditions at Hampton Beach have been exceedingly bad, and have been watched with great apprehension, without having the power to remedy the existing evils. Numerous cases of typhoid fever have been traced directly to that noted resort in the past, having been reported to the State Board of Health by the attending physicians.

A series of shallow wells, many of them driven but a few feet into the sand, in close proximity to outhouses, cesspools, etc., have been the sources of many cases of typhoid fever.

Several years ago a charter was obtained for a water supply, but the system was not constructed, ready for use, until 1907. This system, operated by the Hampton Water Company, extends to practically all parts of the beach, and is, therefore, available to the residents of that locality, and there is no occasion for further resort to polluted wells. Mention of this system will be found elsewhere in this report.

In response to an inquiry made of the constructing engineer for some particulars, the following information was given:

BOSTON, MASS., April 22, 1908.

Irving A. Watson, Secretary State Board of Health, Concord, N. H.

DEAR SIR: Your favor of April 20, relative to Hampton Beach, received. No further steps have been taken in regard to the sewer system of which I wrote. If the matter comes to our office, I will promptly communicate with you.

In regard to the water works system at Hampton Beach, which was designed by me and put in under my supervision and inspection, I may say that no formal report has ever been requested by the board of directors, but, of course, I have all the information at this office.

In general, I may say that the system consists of a group of 2½″ driven wells located at the so-called Gills Springs, a pumping station in which is installed a Deane triplex pump operated by a Wagner motor, with a Deming vertical triplex pump operated by a gasoline engine as auxiliary, a 6″ forcemain running to the highway, where it is enlarged to an 8″ forcemain, which extends along the north shore, behind Great Boars Head, and around Hampton Beach proper to a point just beyond the Casino, from which a 6″ line is continued to the last house. On Great Boars Head is located a 15′ x 90′ flanged steel standpipe, constructed by the Hodge Boiler Works, East Boston, Mass. The system also has some short 4″ and 2″ distribution piping, and there are at present 18 Ludlow fire hydrants connected with the mains. The company is putting in some extensions this spring on the cross streets and back streets at the main beach, and a few addi-

tional hydrants. A fire precinct was organized at the beach last year, and some fire equipment purchased.

It is contemplated some time in the future to construct the main system for Hampton and North Hampton, when a larger supply will probably be located at Marston's Springs. The present supply at Gills Springs is considered temporary, but in my opinion will meet all of the demands of the beach system for several years to come. With the standpipe full, there is a pressure of approximately 55 pounds per square inch in front of the Casino. There are in all about 3½ miles of piping in the present system.

Should you desire information more in detail, I will try to furnish it.

Very truly yours,

(Signed) E. M. BLAKE.

THE SEWER QUESTION.

The following correspondence will give quite a clear idea of the successive steps taken in connection with the construction of sewers at Hampton Beach, together with certain other improvements at that place:

HAMPTON, N. H., May 19, 1908.

Dr. Irving A. Watson, Concord, N. H.

DEAR SIR: As a member of the local board of health, I have had some correspondence with you in the past in regard to the condition of things at Hampton Beach. Since I last wrote you, a system of water works has been installed, and the resultant conditions, as we are without a sewerage system, are much aggravated. We are up against it good and hard. There are quite extensive clam-flats in the way of the natural drainage of this area, and the citizens of the town strenuously object to our allowing sewage to empty upon them. On the other hand, from the point of view of the beach people, that is the most feasible way of disposing of the troublesome question.

Mr. Ross, another member of the board, who is also a civil engineer, has prepared a plan of the beach, and we have ascertained the number of cesspools, out- and in-door privies and vaults, and the grade from the beach to the river, the acreage of the flats, the number of the houses, and an approximate number of the people at the beach in the summer season, with a view to the sanitary conditions at present and as they must be after the majority of the people take the town water the coming season.

Mr. Ross and I will go to Concord on Wednesday, the 20th, to lay the matter before you, for your advice. Should you not be able to see us, please telephone me at my expense tomorrow. I have a telephone in the house.

Yours very truly and respectfully,

(Signed) GEORGE E. GARLAND,

Sec. Board of Health.

A letter somewhat similar to the above was received from Dr. S. M. Ward, a member of the Hampton Board of Health, in which he urged the importance of immediate action to improve conditions at Hampton Beach.

Inasmuch as the question of the water supply from certain wells was under consideration, the board deemed it advisable to send Mr. C. D. Howard, chemist State Laboratory of Hygiene, to make a personal inspection of the locality. His report was as follows:

STATE LABORATORY OF HYGIENE.

CONCORD, N. H., June 4, 1908.

Dr. Irving A. Watson, Secretary State Board of Health.

DEAR SIR: An examination of the sanitary conditions at Hampton Beach was made by me June 3, in coöperation with Messrs. Garland and Ross of the local board of health.

As you know, since the extensive trolley service became available a few years ago, not only has the number of cottage dwellers very materially increased, but this beach has become of late a popular resort for the excursionist. During the height of the season, it is nothing unusual for the beach to be almost daily thronged by the people who come to this place from the cities of eastern Massachusetts for a day or a week's outing.

Hampton has become a case of a country town with a city proposition on its hands. That the conditions at present there existing should be tolerated in any civilized community seems almost inconceivable. While it is true that there may be localized spots of similar character at almost any of the shore resorts, yet the very extensive nature of these conditions throughout the sandy portions of this beach makes it seem nothing short of marvelous that a serious epidemic has not already occurred.

The northern and older portion of the beach is rocky and the overlying soil is close and heavy and readily grows a compact sod. Cottages, practically all of which abut on the shore front, are set comparatively far apart. Most of these cottages are supplied with water from the system recently installed by the Hampton Water Company—water which has been found to be of good quality. Conditions here are as a whole above reproach.

The southern portion of the beach consists of drifting sand that extends from the water's edge to the Hampton River, which empties at a point below and flows from a northwesterly direction. This peninsula is said to be underlaid by a current of salt water that rises and falls with the tides, and is overtopped (within three feet of the surface) by a shallow stratum of fresh water. On account of the fluidity of the bottom and the pressure of the salt water layer, the construction of tight cesspools is represented as being impracticable.

We have in this newly-congested section a condition liable to as suddenly arise anywhere under similar favoring circumstances. On this portion, within an area of less than 3,000 feet long, and from 100 to 600 feet wide, it is estimated that there are now 106 cottages, exclusive of the railway property, which includes a hotel and a number of tenements, in addition to the extensive Casino, or amusement building. In all there are four or five hotels and 175 tenements, not counting a number now building. Many of these have been but recently constructed, are set closely together, and a large portion of them are located in the rear of the shore front, though with the obvious general tendency to squeeze as closely to the beach as possible.

Most of these houses were found to be provided with wells, consisting of iron pipe sunken a few feet in the sand. Every cottage has also either its open earth closet, or its cesspool. As there is a tendency for the latter to fill up quickly, some of the cottages are known to have two or even three of these conveniences; cases are also known where a cottager, having exhausted his own area, has extended his sewage disposal system into the neighboring vacant lot, with the result that cottages have sometimes actually been built over "dead" cesspools.

These cesspools are nothing but shallow sinks excavated in the sand. Commonly they are covered with planking and then by sand, so that their exact location is sometimes rather difficult to determine. Very few, if any, of the closets are constructed with tight vaults. It is represented that the slops deposited in both forms of receptacles not uncommonly cause these to overflow and their contents to spread out over the surface of the sand for considerable areas. To give you an idea of how intimately the wells and the cesspools are associated, I may state that in one area of less than 100 feet square, seven wells were found to be accompanied by seven cesspools. In another even smaller area, flanked on all sides by the back entrances of cottages, it was estimated that there were no less than 15 cesspools and privies, while the pipes of wells could be seen extending above the surface in close proximity to these receptacles. It is nothing unusual to find a well drilled in these shifting sands within 10 feet of a sewage deposit. Evidence was observed in one case of a sewage inundation that had actually come up around the pipe leading from a well.

At the time of my visit matters were in a quiescent condition, as a result of the long rest, and little or no odor was noticeable. Of course the character of the water of many of these wells can be nothing less than filtered sewage. It is represented that the regular dwellers appreciate this and are careful not to drink the water. But there can be no question but that among the large transient population—frequenters of the beach for a few days at a time only—there must be many ignorant or careless enough to use this water for that purpose, and there is nothing to restrain this class from so doing. In my opinion the use of water from most of these wells should be absolutely prohibited, and I believe that this is a case, if ever, where the State Board of Health would be amply justified in asserting its authority under the statute in this connection.

Recently the Casino has constructed a sewer (open much of the way) emptying into a small brook that discharges into the river at a point west from the beach and possibly a mile from where the said river flows into the ocean. It is understood that it is the expectation in some quarters that cottagers will resort to the same means and that the problem of sewage disposal will ultimately be solved in this way. It is evident, however, that this will not afford a wholly adequate or generally satisfactory remedy. The sand flats bordering the creek, through which the sewers would be constructed, are populated by myriads of the flies common to the beaches. These, of course, afford a ready means of communication between any exposed infectious matter and the victim.

Another serious objection to this proposition is that the small brook now carrying the sewage of the Casino empties directly into the middle of an extensive and valuable clam bed. This spells ruin to a product locally famous and amounting, it is estimated, to as much as fifty bushels per day during the season.

In conclusion, I believe that the plan of the board of health to build a sewer

for a distance of several hundred feet out into the ocean will, in the light of successful experience under similar conditions elsewhere, prove the best and ultimately the most economical solution of this problem. Unless the town of Hampton is willing to lose the one great thing for which it is now famous—its beach business, prompt action to remedy the present unsatisfactory conditions is imperative.

Respectfully,

(Signed) C. D. HOWARD.

At a consultation, held between the local board of health of Hampton and the State Board of Health, the subject of sewer construction was gone over quite exhaustively. It was reported that certain private parties had made a move to construct a sewer; that the discharge would reach Hampton River and also the extensive clam flats of the town. The board was advised to serve a notice promptly on these parties to discontinue any attempt in this direction, as it would not be tolerated.

It was recommended that the only proper method of sewering the locality would be to enter the ocean with a sewer at a suitable place below low tide. The question as to whether or not sewage would not find its way back upon the beach, to the detriment of the bathing interests, was raised, and, therefore, it was thought advisable to ascertain the experience of some other locality, especially of Old Orchard Beach, that has sewered into the ocean. Information upon this point was obtained from Mr. C. E. Jordan, C. E., the engineer in charge of the construction of the sewer at Old Orchard Beach, as follows:

STATE BOARD OF HEALTH, MAINE.

PORTLAND, ME., May 28, 1908.

MY DEAR DOCTOR: In regard to the sewer at Old Orchard, it was laid in 1884. It is a six-inch cast iron water pipe in twelve-foot lengths, weighing thirty pounds to the foot. Three hundred feet was put together with lead joints, firmly calked and laid on a board from low water to high water when the tide was out. A spiggot was put in both ends, shutting out the water, and when the tide was high a tug was hitched on the buoy and rope that had been left to mark the outer end of the pipe, and hauled the pipe out to sea until the upper end reached low water mark, and then additional pipe was laid from the low water mark end to high water, and ended in a manhole with a screen on the outlet to prevent solid substances from getting into the pipe.

It was an easy matter to sink the pipe under the sand by undermining it. The spiggot was easily removed from the outlet end, which is about six and one half feet under water at low tide and fifteen and one half feet at high tide. I have put in such a pipe for quite a number of parties, and there would be no difficulty in hauling out a much larger pipe and sinking it under the beach.

As a precaution against the appearance of beach pollution, I have required householders to have on their land a water-tight vault with a trapped overflow, through which the liquid wastes only go into the sewer, and in some places I

have built one large catch-basin through which nothing but screened sewage gets into the ocean.

At Old Orchard and other places the sewage has never been detected. For a place of ordinary size, with the screened sewage delivered two or three hundred feet below low tide, it will never be detected. At most places bathing takes place either at half and mostly at or near high tide, and the wave action and dilution are so great that the sewage effects are obscured.

Yours truly,

(Signed) E. C. JORDAN.

In response to a transmitted copy of the above letter to the board of health of Hampton, the following letter was received:

HAMPTON, N. H., June 2, 1908.

Dr. Irving A. Watson, Concord, N. H.

DEAR SIR: Your communication received and contents noted. We were much pleased to hear from you. We have called a special town meeting to see if the town will vote to install a system of sewers at the beach, and your advice will enable us to answer some questions that are sure to come up before the meeting. We hope the town will see fit to establish a system, for it is of vital importance, not only to the beach, but to the town itself, that our beach be kept in a clean and sanitary condition. It will relieve the local board of great responsibility, should the town do so, for the existing arrangements are alarming and are continually growing worse. As a board, we believe a sewer is the only solution of the difficulty, and that we must have one.

We have notified the parties using the existing sewers that empty on to the clam flats, that they must discontinue the use of the same. We shall feel compelled to enforce that order strictly should the town vote down the sewer, as it is the sentiment of the town, as we are able to gather it, that sewage should not be allowed to flow over the flats. Should we have to do this, we shall be in hot water at once, and it is possible that the aggrieved parties will appeal to the State Board for redress.

We take the position that it is our duty to improve the sanitation, and at once, as an epidemic may start at any time and work great hardship to all concerned. Should such epidemic occur, it would be a death blow to the beach, and we feel that we are justified and in duty bound to take some decided precautionary measures.

We are under great obligations to you for your kindly and cheerful assistance, and should esteem it a great favor if you could add anything more that would assist us in our meeting the coming Saturday.

Thanking you for the courtesy shown us by securing the information relative to the Old Orchard sewer, we are,

Yours very respectfully,

(Signed) THE HAMPTON BOARD OF HEALTH,

PER G. E. GARLAND.

The following acknowledgment was made to the above communication, and represents the exact attitude of the State Board of Health with respect to the question under consideration:

THE STATE BOARD OF HEALTH.

CONCORD, N. H., June 5, 1908.

Mr. G. E. Garland, Secretary Board of Health, Hampton, N. H.

DEAR SIR: I hasten to acknowledge your favor of June 2 and to state that I am pleased to know that you are to have a town meeting to see if the town will vote to install a sewer system at Hampton Beach.

I trust that there will be no hesitancy on the part of the town to take such action as will ensure the construction of suitable sewers for that locality. There is no other public resort place in New Hampshire of equal size where the sanitary conditions have been so unsatisfactory for several years past as at Hampton Beach.

This condition has been recognized by the State Board of Health, and has been quietly watched with a great deal of apprehension while awaiting the time when a public water supply might be forthcoming, as that was the first requisite to the improvement of conditions there. There appeared to be no way to remedy the situation in any marked degree until a satisfactory water supply had been obtained. That time has now arrived, and the State Board of Health will no longer delay in insisting upon certain further improvements. Serious results have already occurred, to the knowledge of this board, but they have not been made public, out of consideration for the economic interests of the town.

The next thing to be accomplished is the proper disposal of sewage. The filthy cesspools, which are a constant menace to health, must be done away with. The numerous polluted wells must be permanently closed. All sewage must be taken care of in a manner so as not to create a nuisance nor to endanger the public health.

With respect to the disposal of sewage, there seems to my mind to be but one proper method, and that is to conduct it out to sea in the manner which I have already indicated in a former letter to you. If the sewage is allowed to run in any other direction and be ultimately distributed upon the clam flats, action will certainly be taken to prohibit the digging of sewage-fed clams. This may be accepted as conclusive. If the clam flats are to be utilized as heretofore, sewage must not be deposited upon them.

Hampton Beach is now a summer resort where thousands of persons go annually, and it would seem that, if the subject were taken into careful consideration by your voters, they should understand that the economic interests of the town demand all that we have suggested, and that at the forthcoming meeting the necessary action would be taken without serious opposition to put such measures into effect without delay.

Very truly yours,

(Signed) IRVING A. WATSON,
Secretary.

AN APPROPRIATION MADE.

The result of the town meeting called for the consideration of the question of constructing a sewer, was reported to the State Board of Health, as follows:

HAMPTON, N. H., June 15, 1908.

Dr. Irving A. Watson, Concord, N. H.

DEAR SIR: In reply to yours of recent date, I would say that in our town meeting we voted to adopt Chap. 79 of the Public Statutes, and also authorized the selectmen to hire the necessary amount of money to construct the sewer, estimated to cost about $10,000. The vote was 93 to 18.

The need of the sewer was acknowledged by all, the only question being how the cost of construction should be assessed. The matter was left with the selectmen, with the understanding that the cost should be paid by the parties benefited. That seemed to be satisfactory to all concerned, as the people at the beach want the sewer and are willing to pay for it.

The part of the beach proposed to sewer at the present time, is the lower end, or the most congested part. We hope, eventually, to take in the whole beach; but the upper end at present is not a source of trouble, and, we think, can safely wait another year, when we hope that the benefit from the sewer at the lower end will be so evident that the town will not hesitate to include that by extension.

* * * * *

Yours respectfully,

(Signed) THE BOARD OF HEALTH,

PER G. E. GARLAND.

The work of constructing the sewer was commenced promptly, but its extension was slow, owing to the fact that most of the ditch had to be curbed on account of quicksands. The work has, however, progressed as rapidly as could be expected under the circumstances. As this report goes to press, the board of health of Hampton reports as follows:

HAMPTON, N. H., September 21, 1908.

Irving A. Watson, M. D., Concord, N. H.

DEAR SIR: The sewer pipe, with the aid of two tugs, has been laid into the ocean, and the land work completed, with the exception of about three hundred feet, and the necessary connections to the abutters' line. It is too late to be of much use this season, but all connections can be made and it put in operation before another season opens. It will not come any too soon, either, for cesspools were overflowing in all directions this summer, though the people did the best they could to take care of them. We chained and padlocked all the wells that were condemned, where the owners did not close them after sufficient notice was given them. The people have found that we mean business, and we have no trouble.

Respectfully yours.

(Signed) GEORGE E. GARLAND.

Quite an extensive examination of the water of the various wells in that locality has been made at the State Laboratory of Hygiene, and a number of them have been found to be contaminated to an extent that renders them wholly unfit for domestic purposes. These wells, as will be seen by the report of the Hampton Board of Health, have been permanently closed, in accordance with the law.

It is gratifying to know of the extensive sanitary improvements which have been brought about at Hampton Beach in a large measure by the efficient action of its own board of health, in coöperation with such advice and aid as could be rendered by the State Board of Health.

PROTECTION OF SUNAPEE LAKE.

A few years ago the State Board of Health, upon legal petition, promulgated rules and regulations for the protection of the purity of the waters of Sunapee Lake. The problem of excluding all sewage from the lake was a large one, in some instances exceeding difficult, therefore the work has been of a slow but progressive character. All sewage from summer cottages, boarding-houses, steamboats, etc., was long ago excluded; but there have remained some cottages at which conditions in violation of the regulation have been found.

In conserving the interests of the locality, the Lake Sunapee Protective Corporation has been an important factor. This is an organization composed chiefly of summer residents who recognize the value of maintaining proper sanitary conditions, as well as other attractive features in connection with the lake as a famous summer resort.

At a meeting of the above named corporation, held early in the season of 1908, a sanitary inspector was chosen and money subscribed to ensure his constant employment during the season. For this office, Mr. A. D. Felch of Sunapee, who has long been an active member of the Sunapee board of health, was selected. In his work he has received the coöperation of the State Board of Health, as he has heretofore as the executive officer of the local board of health.

In his capacity as sanitary inspector, Mr. Felch secured the coöperation of the local boards of health of New London and Newbury, so that the work has been carried on systematically and harmoniously. We take pleasure in inserting herewith Mr. Felch's report to the Lake Sunapee Protective Corporation at the close of the season of 1908:

GENTLEMEN: It is a pleasure to me, as well as an honor, to represent our beautiful Lake Sunapee as sanitary inspector for such a representative body of men as compose the Lake Sunapee Protective Corporation, and in this work it has been my aim so to regulate the many sanitary violations that no party could complain of unfairness, and that your corporation would have no regrets for having trusted this work to me.

The outgrowth of your meeting last September at Soo Nipi Lodge was the investigation of the lake shore by a state inspector, Mr. Charles E. Palmer of Concord, accompanied by some member of the boards of health of Sunapee, New London and Newbury, and the appointment of your sanitary inspector.

On the shores of the lake and its tributaries 60 violations were noted and notices served to comply on or before June 1, 1908. Forty-five of these were in

Sunapee, 17 in Newbury and none in New London. To this number your inspector has added 54, making a total of 114, and I am pleased to report that at this date there are less than a dozen that have not complied, and these, I have reason to believe, will do so at an early date.

There have been constructed 52 cesspools, and the many other corrections asked for were such as the removal or the cleaning out of closets and cesspools, the changing of sinkdrains, the cleaning up around cottages, etc., and, barring George's Mills, which will soon make improvements, the lake shore is well protected. The Otterville sawmill will be supplied with a blower this fall for the purpose of keeping the shavings and sawdust out of the river, a tributary to the lake. At Twin Lakes they have constructed a cesspool to care for the overflow of the original cesspool, so that this sewage may not find its way into the lakes.

To care properly for the work begun it would seem almost a necessity that some way should be provided for the cleaning out of cesspools and the conveying the contents back onto the farms, where it would prove a benefit, and not to dip it out and leave it about the cesspools as many have done in the past, to wash into the lake. For this work we have here today a representative of the ——— Manufacturing Company, Boston, Mass., who will explain the working of the ——— Cesspool Cleaning Outfit, which I believe would prove a valuable outfit to be used about the lake, as its use would solve many hard problems.

For the better protection of the lake I would suggest that we consider the advisability of asking the Woodsum Steamboat Company to place rubbish barrels on all their principal wharves, also one on the upper deck of the *Armenia White*, with the health laws posted. Into these barrels should be thrown such things as paper, picnic garbage, boat and wharf sweepings and the contents burned under the boilers. While it is true that many things which are thrown into the lake are not filthy and would not in any way contaminate the water, yet such practice conveys the impression to the observer, to whom we would advertise our lake, of being unsanitary and that the parties are careless, thoughtless and indifferent to the best interests of the lake.

At the lake station I found the closet accommodations very inadequate for the large crowds that the railroad often lands there, and I have taken the matter up with the superintendent of the Concord and Claremont division, and have his word that next season's contemplated changes will include better closet accommodations at that place.

In my work I have been very cordially met, and to the Lake Sunapee Protective Corporation, the Woodsum Steamboat Company, the hotels about the lake, and to all others with whom I have had dealings I would express my appreciation of their kindly coöperation in the work.

Respectfully submitted,

(Signed) A. D. FELCH,
Lake Sunapee Sanitary Inspector.

SUNAPEE, N. H., August 6, 1908.

The suggestion which Mr. Felch made in the above report, that rubbish barrels be placed upon the principal wharves, etc., was promptly inaugurated about the time that his report was made. Upon each of these receptacles is pasted a large placard, reading as follows:

NOTICE.

THE THROWING OF WASTE MATTER OF ANY KIND INTO THE LAKE IS PROHIBITED.

PUT ALL REFUSE INTO THIS BARREL.

PER ORDER, BOARD OF HEALTH.

The foregoing is given for the purpose of showing, not only that good sanitary supervision is afforded Lake Sunapee, but also what may be accomplished by a voluntary protective association.

TYPHOID FEVER AT LISBON, N. H.

During the month of March, 1908, typhoid fever made its appearance in the village of Lisbon, in a few scattered cases. The cause of the disease was not at first apparent, and it was, therefore, thought advisable to make an investigation to learn its source. To that end, the State Board of Health requested Dr. H. N. Kingsford, Bacteriologist, to visit the locality for the purpose of solving the problem, which he appears to have done successfully.

At the time of Dr. Kingsford's visit there were twelve positive cases and four of a suspicious character, all of which were located somewhat widely apart. His report is given herewith:

LABORATORY OF HYGIENE.

HANOVER, N. H., March 16, 1908.

I. A. Watson, M. D., Concord, N. H.:

DEAR DOCTOR: I went to Lisbon as requested on March 7 and returned Monday, March 9, and found the following condition:

Water Supply: The water supply is from Pearl Lake or Mink Pond. This pond is in the hills about four miles east of the postoffice. The pond is supplied by two brooks which come from the higher hills to the east of the pond; there is no one living on these brooks. Last summer and fall there were two camps way up toward the head of these brooks, but they were quite a distance from the brook; there was no sickness in the camps. In my opinion the drainage would not get into either of the brooks had the men been sick.

The brooks run into the pond through woods and over rocks, and empty at the east end. Around the pond there are a few summer houses, and over on the Landaff side there are a few farms whose drainage could get into the pond. There has been no typhoid fever in any of these houses for years.

The pond covers quite a large area, is very deep in places, and there are numerous springs around the edges and in the deeper portions.

A brook runs from the pond along side the main road over stones and with considerable fall for about one mile, where there is a dam, which holds back about one million gallons of water, and here in this reservoir is the intake for the Lisbon water. On each side of the brook is a high bank, and on the north side runs the road, and above the road are two houses which drain into the brook. These houses are quite a distance from the road, but the drainage gets into the brook. The drainage from the road runs directly into the brook. There is a good chance to run a ditch along this road, which would take all the road water and also all the drainage from the buildings on the side of the hill. They have attempted to

ditch it but the ditch is not nearly deep enough to do the work. There has not been any sickness in any of the houses along this road. I told Mr. Chamberlin, one of the water commissioners who was with me, how the ditch should be dug. From the intake the water runs in pipes into the town. They have some trouble with color in the water; this could be corrected if the ditch were attended to. The water supply is all right.

Sewerage: Practically all the houses in the town are connected with sewers, and most of them empty into a main sewer, which empties into a canal at the lower end of the power house. The outlet of this sewer is supposed by most of the people in town to be into the canal at the bridge, but the pipe runs into the canal near the bridge, but the outlet is under the floor of the power house.

There are three small sewers from the Parker Building Drug Store and Masonic Block which empty into the canal and above the power house.

Oysters: There are six different men who supply oysters to the town, and they buy them of reputable firms. I secured a pint of each and sent them to the State Laboratory of Hygiene, simply to see if there were any adulteration or preservative in them. I purposely got plenty of liquid with them.

Milk: Four different milkmen supply the town. I went to each farm and bought milk from each on the street.

W. E. Palmer: House and barns about one mile north of postoffice. Water supply and sanitary conditions of buildings and cows good.

Milk:	Formalin	None
	Water	85
	Fat	4
	Bacteria	150,000

E. E. Clark: House and barns situated at the north end of the village. The sanitary conditions are ideal.

Milk:	Formalin	None
	Water	85
	Fat	4.5
	Bacteria	50,000

L. S. Ash: House and barns situated on a high hill about one mile west of the town; the sanitary conditions are O. K.

Milk:	Formalin	None
	Water	86
	Fat	4
	Bacteria	100,000

G. C. Hanno: House and barns situated about one mile and a half north of town. The water for buildings comes from springs in hill east of buildings and seems to be all right. The drainage from the house and barns, not good; cows are very dirty; cow stable small and poorly ventilated; cart dirty; place where the milk is strained, dirty; cans and pails, clean. There is a case of typhoid in the other side of the house in which Hanno lives. This case, however, may not

have been contracted in Lisbon, as the man has been away from town more or less.

Milk:	Formalin	None
	Water	88
	Fat	3
	Bacteria	950,000

In the analysis of the milk I noted only the four conditions mentioned in report.

During the thaw on February 18, 1908, the ice in the brook between the pond and reservoir went out and smashed the intake down so that no water could get into the pipes. Along in the evening it began to get cold, so that the water commissioners became alarmed, and, in order to prevent the pipes from freezing and to protect the town in case of fire, they turned into the pipes water from the canal mentioned in this report. This water was turned on at 5.15 p. m., on February 15, 1908, and shut off again on February 19, at 6.30 a. m. The five dead ends were blown off about 7 a. m., on February 19, and were allowed to run for about five or ten minutes each. The canal water is the river water, which brings along the sewage from Littleton, Whitefield and other places, and the canal water also had the sewage from the three blocks mentioned in this report. There was a girl sick in one of these blocks, whom the doctors now think had typhoid fever; however, there is some question about her being sick before the water was turned on. The blood is positive now.

All the cases of typhoid have at some time used the town water to drink since the water was turned in from the canal. No new cases seem to be coming along now. The late cases have all been feeling ill for a number of days but have not had to call in a doctor. I do not think it possible for the canal water to have run out of the pipes in the short time they were opened on February 19.

In my opinion the cause of the typhoid is this canal water.

Suggestions: That the board of health get after milkman Hanno and make him clean up his cows and stable and fix up the drainage, for when fly time comes there may be trouble from there.

That the board get after the water people and have them ditch the road beside the brook.

That the people boil the water for a while.

That under no circumstances should they turn into the pipes the canal water.

That the board of health should consist of three men and not of one. Doctor Spear is the only member and he is a good man and has put in considerable time; but one man cannot attend to all of the work.

(Signed) H. N. KINGSFORD.

FOOD, DRUG AND LIQUOR INSPECTION.

FOOD, DRUG AND LIQUOR INSPECTION.

BY C. D. HOWARD, CHEMIST.

Dr. Irving A. Watson, Secretary State Board of Health.

DEAR SIR: I herewith submit my report of food, drug and liquor inspection for the period of 23 months ending August 31, 1908.

Since the issue of the last report, the work in this connection has been put upon a much better basis through the enactment of the Food and Drug Law of 1907. This law not only materially strengthens our hands in that it eliminates a former notorious means for evasion, but it provides an effective and much needed instrument for combatting the misbranding evil. The measure also establishes definite standards for drugs, settles the past uncertainty relative to the status of liquors and definitely restricts the use of chemical preservatives in foods.

That portion of the law relating to guaranties has served to make it popular with the retailer, and the latter is fast coming to appreciate this method of protection at its full worth. The argument that an article which the jobber does not care to stand back of must have something wrong with it, is proving effective. On the other hand, it sometimes happens that the character of the goods is improperly sustained by the guaranty; and, as relatively little manufactured food is prepared in New Hampshire, but is shipped in from other states, this might lead to an embarrassing situation.

With the inception of the new law, however, this laboratory has been in a position to deal, indirectly, with the outside manufacturer or jobber through the appointment of the writer as a special United States food chemist. Acting in this capacity, goods collected in this territory by federal inspectors have been analyzed, and such service has been responsible in a number of cases for directing the attention of the federal officials to offending manufacturers. Recently, our position in this respect has been further strengthened by the conferring on the part of the Secretary of Agriculture of special authority to collect samples and bring suits in the federal courts. It is believed that with the acquiring of better facilities for inspection this arrangement will ultimately prove of much value.

As in the past, most of the samples, with the exception of milk and liquors, have been personally collected by the chemist or his assistant. It

is manifest that under such circumstances the store inspection is but an apology for what it ought to be. The services of at least one regularly appointed inspector who shall give much or all of his time to the work, are urgently needed.

Modern sentiment is overwhelmingly in favor of more cleanly and hygienic conditions governing the manufacture and sale of food-stuffs. New Hampshire is behind the times in not having any legislation covering this point. While the consideration at the coming legislative session of a sanitary food measure is earnestly recommended, nevertheless it must not be forgotten that, were such enacted into law, its enforcement without the services of an inspector would be out of the question. It may not be improper to remark here that provision for such inspection service should not be the result of the creation of any new state office—as has been suggested; not only should the appointment be controllable by this department and made from a general appropriation, but it is vitally important that all appointees shall be specifically subject in all matters to this department's instruction and direction.

It seems desirable in this connection to refer to another handicap under which we are laboring, affecting not only the work here reported, but that of water analysis. Mr. Wallace F. Purrington, who has rendered good service as assistant chemist, is about to sever his connection with this laboratory in order to accept a more remunerative position elsewhere. The compensation attached to this position, however adequate by past standards, is now such as to attract only newly graduated men, those who have no practical knowledge whatever of the work involved, and who are only willing to accept the position because of the valuable experience that it affords. This means that the chemist is compelled to spend very much of his time in connection with the performance or oversight of ordinary routine analysis, thus seriously detracting from the proper degree of efficiency of the department.

If this work is worthy of support at all—and it is to be believed that the general public heartily so regards it, despite the proverbial belief in the inappreciation of the latter relative to such matters—then it surely merits a more generous appropriation than has hitherto been accorded. I am informed that Michigan has an appropriation of $25,000 per year; Ohio, $55,000, while Minnesota annually expends from $50,000 to $60,000 in enforcement of its food and dairy laws. Even on the basis of assessed valuations, the sum expended by New Hampshire for the same purpose is by comparison insignificant. A fully as interesting comparison might be drawn between this and some of our neighbor states, while to come still nearer home, there is the striking fact that the health department of one

of our own cities annually expends more than double the amount appropriated for all departments of the work of this laboratory.

During August of this year I attended the convention of the Association of State and National Food and Dairy Departments, held at Mackinac Island, Mich. This meeting was composed of delegates from the various states and from the United States Department of Agriculture who are engaged in similar endeavors. Among transactions of especial interest were the final adoption of standards for meats and meat products, and for liquors; resolutions condemning the use of chemical preservatives in foods; opposing the bleaching of flour by chemicals; favoring the adoption of a law requiring the dating of all packages of food products, as well as a statement thereon of their net weight or volume. A committee was appointed for the purpose of drafting a uniform state food law, and your representative had the honor of appointment upon a similar committee charged with the drawing up of a sanitary food bill for submission to the state legislatures.

The following is that portion of President Ladd's address embodying the latter's arguments in favor of the net weight and dating requirements. After quoting Commissioner Slater of Minnesota as authority for the assertion that the greatest food fraud of today is that of short weight and short measure, President Ladd says:

Unfortunately, the wording of the National Food Law has encouraged this kind of fraud. It may almost be said to have placed a premium upon this type of fraud by inducing the manufacturers to prepare and place upon the market goods to be sold by the package, rather than by the pound. In 90 per cent of such cases, these special packages have been prepared for no other purpose than to aid in continuing the perpetration of fraud of too long standing, but which has now been made to take a new form.

Raisins and currants are being put up in packages and sold as such, presumed by the purchaser to contain one pound, when, in reality, they contain from 11 to 14 ounces. Oysters, put up in cans, supposed to contain, and are sold for, one quart, have been found to contain actually one-sixth of a gallon. Here the consumer purchases, as he supposes, a one-quart can for which he pays 35 cents; in reality, he is paying at the rate of 52½ cents, since it requires six of these quarts to make a gallon. Therefore, the profit to the dealer on this short weight alone is 21 per cent. Let us take, for example, another case, that of a carload of canned strawberries shipped to Fargo during the past year, labeled "First Quality—for family use." They were in reality slops, since the can contained but 2½ ounces of strawberries, which did not pass through cheese cloth, and 19 ounces of water. Why should the people pay freight on this much of water from Baltimore to Fargo, and why should they not know the true weight and grade?

I care not what the canner may assert, I charge that in off years of light crop or of high prices there are those who slack fill their cans and add more water; while, in years of plenty and low prices, they fill their cans full of food material.

There are packers of food products who change the size of their special can to meet their needs. What harm comes if they are honest and there is no fraud practised in printing on the labels the true weight and grade for the benefit of the public? Why should a man get six quarts of whiskey or oysters out of a gallon; or, why should 3½ ounces of spices be sold at the same price along beside a standard 4-ounce container; or, 1½ ounces of lemon extract in a 2-ounce carton; why should the people be short-weighted and measured simply because, as a compromise measure, the national law permits of fraud to be practised with this class of food-products? It is said that one of the trusts, most strongly opposing this provision, originally in the national food law when before the committee of Congress, have during the past two years removed but a single count from one of their well-known packages, and that their enormous business saved the company $100,000. Should the people not know of this condition? When lard is sold for five pounds and the pail contains but 4½ pounds, a fraud is committed and intentional deception practised. Every container should not only show the true net weight, but these should be standard weights and measures for all such products generally sold by the pound, quart, gallon, bushel, etc. Such cases as I have mentioned are too common to make it necessary for me to go deeper into details.

DATE OF THE CAN.

There has been considerable discussion of late as to whether package and canned goods should be made to show the date when they were put up. I believe that every tin container and every sealed package should be made to show the date when the same was put up, and, in the case of canned goods, this should be indented in the tin cap itself. Such a measure would protect the people against fraud, not always practised by the manufacturer, but more often by the commission brokerage concerns, who purchase and relabel goods, sometimes five years or more in age, and sell as fresh products under a new brand and label. A measure of this kind would, instead of being detrimental to the retailer, benefit him by insuring freshness of stock and prevent the loading up of old stock. Fresh goods should command a premium over stale goods, or old goods carried over a length of time; and the people have the right to know that this is the condition.

That there is a great deal of truth in this matter of short weight and measure must be evident to any one who will take the trouble to investigate it for himself in the case of almost any of the articles mentioned above,—say, the "five-pound" lard pail, for instance. And this practice of giving short weights is by no means confined to the retail package. The provision man, for example, will complain that the 50-pound box of lamb chops that he orders contains but 45 pounds, and that he has to put the price up to the consumer sufficient to cover the deficiency. In other words, the consumer, as usual, pays for the fraud.

LABELING OF BULK GOODS.

Another matter that is demanding attention is that of the label on the retail package of bulk goods. The law provides that the label shall not

only tell the truth in a general way, but that in many cases the latter shall convey certain information. Undoubtedly, the intent of the law is that the final purchaser, *i. e.*, the consumer, shall be the recipient of this information. Of what utility can this section of the law be if it allows the grocer to fill the applicant's order for cider vinegar from a barrel in the cellar labeled as colored distilled vinegar; or the order for molasses with "glucose and molasses compound"; or permits the provision dealer to supply a telephone order for "sausage" from a box labeled "Compound. 60% sausage meat, 20% cereals, 20% added water"? Of what utility is the label "Blended sugar; made from maple and cane sugar" on the shipping case from which the dealer supplies the child's request for "maple[1] sugar"?

Thus far, observance of the labeling clause, as applied to bulk goods, has been only on the part of the manufacturer and jobber; the retailer has paid no attention to the matter. But the time has now arrived when the latter must pass this information on to those for whom it is logical to believe it was intended. Unless the attorney-general should hold it as unwarranted, I would recommend that an order be issued requiring that each and every retail package, vessel or container of every sort filled with bulk goods by the retailer shall bear a label embodying the information contained upon the wholesale package.

PROSECUTIONS.

Thus far, in addition to his other duties, the chemist has been charged with the general conduct of prosecutions instituted by this department.

During the period covered by this report the following prosecutions have been brought under the food and drug laws of New Hampshire. This list includes all cases resulting in conviction of the defendant or a decision against the latter by the lower court:

1. J. F. McDuffee, Manchester, sale November 15, 1906, of cream adulterated with formaldehyde. Indicted by grand jury and case adjusted upon payment of fine and costs.

2. John Gallagher, Manchester, sale March 27, 1907, of milk adulterated with formaldehyde. Indicted by the grand jury and case adjusted upon payment of fine of $25 and costs.

3. John A. MacAfee, Merrimack, sale April 27, 1907, of milk adulter-

[1] Nevertheless, the attorney for the defence in connection with one of our maple sugar prosecutions blandly stated that "you can sell anything if it is on the label; that is so of all food laws"—despite the fact that the law bearing upon the case expressly provides that "no person shall sell . . . any article as and for maple sugar . . . . unless the same shall be . . . made solely from the sap of the maple tree."

ated with water. Indicted by grand jury and case adjusted upon payment of fine of $25 and costs.

4. ———, Manchester, sale May 29, 1907, of ice cream adulterated and below standard. Paid fine of $10 and costs.

5. C. A. Hammond, Goffstown, sale May 29, 1907, of milk adulterated with water. Indicted by grand jury and paid fine of $25 and costs of $15.

6. A. D. Smith, Manchester, sale June 12, 1907, of ice cream adulterated and below standard. Plead guilty and case continued for sentence.

7. George Xanthaky, Manchester, sale June 12, 1907, of ice cream adulterated and below standard. Plead guilty and case continued for sentence.

8. Maesimoso Celata, Concord, sale June 22, 1907, of ice cream below standard. Paid fine of $10 with costs.

9. George Xanthaky, Manchester, sale November 19, 1907, of adulterated ice cream. Paid fine of $10 with costs.

10. West Pearl Pharmacy, Nashua, sale February 19, 1908, of adulterated precipitated sulphur. Indicted by grand jury and case adjusted without trial.

11. F. A. Walch, Nashua, sale February 19, 1908, of extract of peppermint below standard. Indicted by grand jury and case continued for sentence upon payment of costs.

12. Rumazza Bros., Rochester, sale February 22, 1908, of adulterated maple sugar. Found guilty by trial justice and fined $5 and costs. Appealed and case pending.

13. Enterprise Grocery Co., Rochester, sale February 22, 1908, of adulterated catsup. Plead guilty and fine of $25 and costs imposed, the fine being suspended.

14. Enterprise Grocery Co., Rochester, sale February 22, 1908, of adulterated ginger cordial. Plead guilty and imposition of sentence waived by state.

15. Bert Rafaelli, Tilton, sale March 31, 1908, of adulterated maple sugar. Paid fine of $10 and costs.

16. Arthur Dedes, Portsmouth, sale by servant April 13, 1908, of adulterated maple sugar. Bound over by trial justice and case awaiting action of grand jury.

17. George Pappas, Dover, sale April 13, 1908, of adulterated maple sugar. Bound over by trial justice. Grand jury refused to indict.

18. L. Bacigalugio, Manchester, sale May 5, 1908, of adulterated maple sugar. Paid fine of $10 and costs.

19. L. H. Hobby, Dover, sale June 11, 1908, of ice cream below standard. Bound over by trial justice. Grand jury refused to indict.

20. W. W. Finley, Dover, sale June 11, 1908, of ice cream adulterated and below standard. Bound over by trial justice. Grand jury refused to indict.

21. John Daeris, Dover, sale June 11, 1908, of ice cream adulterated and below standard. Bound over by trial justice. Grand jury refused to indict.

22. I. Finnman, Manchester, sale June 17, 1908, of ice cream adulterated and below standard. Paid fine of $15, with costs.

23. P. Lavoie, Nashua, sale June 17, 1908, of ice cream adulterated and below standard. Fined $15 and costs, fine suspended upon payment of costs.

24. H. Kandar, Manchester, sale June 17, 1908, of ice cream below standard. Paid fine of $15, with costs.

25. M. R. McLaughlin, Manchester, sale June 17, 1908, of ice cream adulterated and below standard. Indicted by grand jury and paid fine of $10, with costs of $15.

26. C. H. Baroody, Manchester, sale June 17, 1908, of ice cream adulterated and below standard. Indicted by grand jury and paid fine of $10, with costs of $15.

27. A. Chartrain, Nashua, sale June 17, 1908, of ice cream adulterated and below standard. Fined $15 and costs, fine suspended upon payment of costs.

28. C. Chicklis, Concord, sale July 1, 1908, of ice cream adulterated and below standard. Paid fine of $10, with costs.

29. F. A. Foster, Lynn, Mass., sale at Concord State Fair of adulterated cider. Fined $25 and costs, fine suspended upon payment of costs.

In addition to the above, a case for the sale of imitation maple sugar as genuine was discharged on the ground that the inspector had examined the shipping case from which the sample was sold and was therefore not deceived as to the character of the goods he was purchasing. In a similar case the inspector's testimony was met by a general denial on the part of the defendant, and the latter was discharged. It will be noted that the grand jury failed to find indictments in three of the ice cream cases listed above, as well as in one involving an illegal sale of maple sugar, notwithstanding that the testimony given before the police magistrate had seemed sufficient to the latter to warrant him in binding over the defendants.

That this jury should have refused to indict would seem to indicate that it was governed by the question of expediency rather than that of law or of evidence. While a strict interpretation of the statute would make

it obligatory upon the State Board of Health to report *every case* where there was satisfactory evidence of violation, yet all officials charged with the enforcement of laws of this nature understand the utter impracticability of any such course. It is easy to punish the unfortunate or degenerate, guilty of petty crimes against decency or property, but the dealer or compounder who chooses to rely upon his respectability and standing in the community to protect him in his wilfully careless attitude toward the requirements of the food and drug law, is a more difficult proposition. While attempting to be perfectly impartial, and without any desire to make a "record," this department endeavors to select its cases with due care, having in mind not only the degree of the offense involved, but the ultimate good to be obtained in securing a stricter observance of the law.

PROPOSED LEGISLATION.

Certain items and statements in the foregoing are suggestive of what this department has to encounter in connection with existing court procedure in this state. According to a Supreme Court decision of some time ago, the ordinary trial justice has no jurisdiction over the settlement of cases where the minimum fine involved is $10 or more. Therefore, where the defendant chooses to plead not guilty, all that can be done is to bind over the latter for the grand jury. The present minimum penalty attached to the food and drug law is $25, and there is a proviso that all such cases must be reported to the county solicitor; *i. e.*, laid before the grand jury. In my estimation this is a mistake; the character of the offense involved in most of these cases is of such nature as to bring them more properly in the Police Court, and I believe that the law should be so amended as to make it possible to settle the majority of such cases in this court.

Another desirable measure, already referred to, is a "sanitary food law"; *i. e.*, a law establishing certain requirements relative to the sanitation of stores, shops, factories, etc., where food products are being handled or manufactured. It is probable that such a measure will be introduced at the legislative sessions of a number of the states this coming winter; several of the latter already have very excellent laws of this kind, and it is now high time that New Hampshire took action in this matter.

Other pertinent matters for legislative consideration are:

The enactment of a minimum standard for cream.

A law regulating the sale of renovated, or process butter.

Transfer of the duties relative to the inspection of butter and oleomargarine from the State Board of Agriculture to the State Board of Health.

The present arrangement is an obsolete one. The latter board is charged with, and is equipped for, the inspection of every other article of food and there is no present reason why butter alone should be excepted.

The enactment of recognized standards for certain articles of food and drink; either this or an amendment giving more specific authority to the State Board of Health to establish and enforce standards. While such authority as based upon existing legislation has not been questioned thus far, nevertheless experience teaches that in connection with prosecutions it is always a matter for satisfaction to be able to base one's case upon a specific statute fully and definitely covering the matter and thereby leaving no chance for quibble or doubt.

WARNING NOTICES.

Under the old food law, in order to secure a conviction it was necessary to prove that the dealer had a guilty knowledge that the article sold was not conformable. Any person who has had experience in attempting to enforce a law of this nature by the aid of the warning notice alone, realizes that such attempt is bound to be more or less of a failure. That the past few years have witnessed a very considerable improvement in the character of the foods and drugs sold in New Hampshire is to be attributed very largely to the action of the manufacturers and jobbers as a result of the publicity accruing from the *Bulletin*.

Under the new food and drugs law the necessity for the warning notice no longer exists. This is not altogether because conviction does not now have to be based upon guilty knowledge. In the jobbers' guaranty provision both the food and drug retailer have an admirable means of protection. For the druggist the United States Pharmacopœia is the legal standard, and the latter's necessary professional knowledge not only tells him what these standards are in the case of his own preparations, but it affords him a ready means in many cases of checking up such for himself. In the case of vinegar, maple and dairy products, ice cream, etc., it is a part of the producer's business to know what constitutes a legal product. In such instances the rendering of a warning notice can properly be considered as really justifiable only when the sample shows a not unreasonably large deficiency in some one of its natural constituents.

FOOD EXAMINATIONS.

Following is a summary of the food examinations made during the period covered by this report. It being the practice to collect only suspected brands, and only those kinds of foods liable to sophistication, these figures should not be construed as representing the general condition.

	Total.	Not conformable.	Per cent. not conformable.
Baking powder	19	6	31
Bottled beverages	31	18	58
Butter	5	0	0
Catsups and table sauces	18	8	44
Cheese	2	1	50
Cream	25	10	40
Cream of Tartar	12	5	42
Coffee, tea and cocoa	9	4	44
Celery salt	4	4	100
Cider vinegar	74	25	34
Cider	3	0	0
Canned vegetables	5	0	0
Canned meats and fish	4	0	0
Dried fish	12	4	33
Extract lemon	54	33	61
Extract vanilla	36	16	44
Extract orange	11	6	54
Extracts peppermint and wintergreen	16	6	37
Imitation fruit extracts	11	5	45
Other flavoring extracts	11	2	18
Frankfurts, sausage and hamburgher	34	0	0
Gluten flours	14	4	28
Horseradish	6	0	0
Honey	16	1	6
Ice cream	157	104	66
Lard	6	0	0
Milk	265	(see special report)	
Maple sugar	30	14	46
Maple and mixed syrups	32	16	50
Molasses (adulterated with glucose)	60	8	13
Oysters and clams	39	0	0
Pepper	30	2	6
Other spices	4	1	25
Pickles	9	6	66
Preserves, jellies, etc.	5	4	80
Salad oils	12	0	0
Other examinations unclassified	40	6	15
Total samples	1,121	——	——
Totals, foods other than milk	856	319	37.2

MILK AND CREAM.

Two hundred and sixty-five samples of milk have been received for analysis. These samples were collected for the most part by local health officers acting for the town or as special agents of the State Board of Health. Of the above number, one hundred and thirty-two, or 50 per cent., were found to have a total solid content of less than 13 per cent., while the solid content of sixty of these one hundred and thirty-two samples was under 12 per cent.

The total solid contents of the majority of the milk samples received at this laboratory during the summer months falls between twelve and thirteen per cent., indicating that, as is perhaps true of all the New England states, the New Hampshire supply is derived chiefly from Holstein and Ayrshire stock. The fact that these cattle are heavy milkers causes them to be especially favored by the producer for the large city markets, who would find no profit whatever in supplying the rich but scanty product of the Jersey on the basis of prevailing prices and cost of production.

Thus far no prosecutions have been brought in this state for the sale of unadulterated sub-standard milk. In fact, any attempt at such based upon failure to comply with the winter standard would, under the New Hampshire system of precedure, be more than likely to prove unsuccessful. The present law establishing two standards is illogical and out of date and should be repealed in favor of a minimum all-the-year-round standard. That the producer of milk rated as of good standard quality on September 30 should on the next day be liable to a penalty for the sale of the same milk, is an absurdity. While there can be no question that the tendency is to the production of a little richer milk during the winter months, yet the difference in the case of the average producer does not amount to anything like one per cent. of solids, or one half per cent. of fat. Under modern conditions and with the present breeds of cattle in use experience abundantly teaches that the 13 per cent. standard is too high. It would be far better to establish a minimum standard of 12.25 per cent., or even of 12 per cent.—values that are sufficiently low for the average healthy cow of any breed to meet—and thereby be able to hold the producer to a requirement that is susceptible of enforcement.

The total number of samples of milk found to contain added water is twenty-five, representing thirteen producers or dealers. Seven samples, representing five producers or dealers, were found to be skimmed, while ten samples, representing three producers or dealers, were adulterated with formaldehyde.

The adulteration of cream with formaldehyde was also noted in three

cases, and two samples were found to have been thickened with sucrate of lime.

In all, the analyses presented evidence against twenty-three dealers or producers showing deliberate adulteration. In the case of the Hillsborough County offenders this department has had the coöperation not only of the local inspectors but of the prosecutors and the juries, and convictions uniformly resulted. In most of the other counties involved in this connection there was a uniform refusal, direct or implied, on the part of the local authorities either to initiate any action themselves (the law expressly places the inspection of milk upon the cities and towns) or to lend any coöperation on our initiative. This refusal most frequently took the form of failure to make any reply to correspondence relative to such action.

Another handicap to the effective enforcement of the milk law is in the fact that it is the practice with a number of health officers to delegate the collection of samples to other individuals, the result being that these samples not only sometimes arrive in bad condition and improperly sealed, or not sealed at all, but it is frequently only too evident that the sample has been so taken as to be of little or no value. In one instance of which we chanced to hear, the empty bottles were delivered to the various dealers with instructions to fill and bring in the next morning. Obviously, unless the inspection can be carried out in the proper manner, the samples are not only of no value as a basis for prosecution, but there is a chance of doing the dealer a serious injustice.

The above remarks are offered, not in a spirit of complaint but to give some idea of the difficulties under which this department at present labors in endeavoring to secure the enforcement of the law that the general public naturally and properly expects in such cases. It is fully appreciated that for a business or professional man to become involved in criminal proceedings against his fellow citizen is a peculiarly disagreeable and embarrassing situation; nevertheless, until this department can have some regularly appointed inspectors of its own—men who do not have to feel that they are restrained by reasons of policy from presenting evidence in court—it seems very apparent that the present too large rates of adulteration in the case of milk is liable to continue to hold for certain counties of the state.

The sanitary side of milk production is a matter deserving of quite as much attention from an inspection point of view as that of compliance with chemical standards. While the ideal condition of cleanliness was observed in but few, if any, of the samples submitted, yet most of such were found to be free from excessive quantities of dirt and sediment. The condition of a number, however, was objectionable and a few were found to be very dirty. In other states this matter is receiving quite a little attention, and prosecutions for the sale of dirty or disease-laden milk

are by no means uncommon. The proper initiative in such cases is through an inspection of the dairy. While but little can be done by the state in this connection at present, yet an excellent field is offered for the attention of town and city inspectors. The cities of Concord and Manchester have already taken up this matter, a milk ordinance recently enacted by the city of Concord being of especial excellence and well worthy of adoption by other New Hampshire towns.

The milk inspection data is presented in detail in the following table:

Towns.	Total samples.	Below 13 per cent. solids.	Below 12 per cent. solids.
Berlin	27	19	9
Center Ossipee	2	1	0
Claremont	10	4	1
Center Harbor	1	1	0
Derry	6	5	2
Dover	16	7	1
Franklin	12	5	3
Gilsum	1	1	1
Hooksett	2	1	0
Hanover	7	1	0
Hampton	1	0	0
Hampton Falls	9	6	1
Keene	7	4	3
Lancaster	3	2	0
Lebanon	17	6	1
Laconia	20	12	5
Littleton	8	6	2
Lincoln	1	1	1
Manchester	32	17	17
Newport	6	5	2
Newbury	2	2	1
Pembroke	17	6	2
Plymouth	8	0	0
Portsmouth	7	4	1
Pittsfield	6	2	0
Rochester	8	1	0
Sunapee	6	3	2
Somersworth	15	7	5
Seabrook	5	2	0
Tilton	1	0	0
Walpole	2	1	0
	265	132	60

In connection with the above table it should be noted that all of the Manchester samples represent special cases in which the local inspection department had previously found evidence of deficiencies. The samples were for the most part taken from producers in neighboring towns supplying the city of Manchester, the local inspector acting as a special agent for the State Board of Health. Complaints were entered in most of these cases and the defendants successfully prosecuted.

The five Laconia samples shown in this table as containing less than 12 per cent. of solids were all found to have emanated from the same producer, by whom they had been watered. This milk was first discovered on sale at the stores of two Lakeport grocers. Instead of holding these responsible, an attempt was made to run down the guilty party. The milk was found to have passed through several hands, but satisfactory evidence for the prosecution of the real culprit could not be secured.

Twenty-five samples of cream were received for analysis, ten of which were found to be below the minimum standard of 18 per cent., while three, as previously noted, were adulterated with formaldehyde. The specific legislative enactment of a minimum standard for this product is to be desired.

ICE CREAM.

An act of the last session of the New Hampshire Legislature, in effect March 22, 1907, provides that:

> No person shall manufacture for sale, keep for sale, sell, exchange, barter or deal in ice cream which shall contain any substance other than milk, cream, eggs, sugar and some neutral flavoring, or which shall contain less than 14 per cent. of butter fat.

In connection with the enforcement of this law, 157 samples of ice cream have been collected and examined during the last quarter; most of these samples were taken by local health officers, acting as special agents for the board.

Of the 157 samples examined, 53, or 33.8 per cent., were found to conform to the law; of the remaining number, 26, or 16.5 per cent., were deficient only in butter fat content; 30, or 19.1 per cent., were adulterated with a prohibited substance, although containing the required amount of fat; while 48, or 30.6 per cent., were found to be both adulterated and below standard. In all, 104 samples, equivalent to 66.2 per cent., failed to conform to requirements.

In the following table this data is given by towns, those towns being represented from which five or more samples were received:

Towns.	Legal quality.	Per cent	Adulterated though containing required amount of fat.	Per cent.	Deficient in fat only.	Per cent.	Deficient in fat and adulterated.	Per cent.	Total samples.
Berlin	1	13	0	00	3	37	4	50	8
Concord	9	56	2	12	2	12	3	20	16
Dover	6	17	9	25	5	14	16	44	36
Franklin	3	45	0	00	2	27	2	27	7
Keene	3	60	0	00	0	00	2	40	5
Manchester	15	50	7	22	2	6	7	22	31
Nashua	7	36	2	11	5	26	5	26	19
Portsmouth	0	00	4	80	1	20	0	00	5
Rochester	3	61	4	30	0	00	1	9	13
Wolfeboro	0	00	1	20	1	20	3	60	5

While there can be no question that gelatine and other fillers are frequently used in ice cream manufacture for the purpose of replacing the cream that should be present, yet manufacturers contend—and probably with considerable truth—that in the case of goods intended to be shipped, or to be kept over much more than twenty-four hours, the use of a small quantity of some emulsifying agent (such as gelatine, gum tragacanth, or agar-agar) is indispensable for the purpose of causing ice cream to "stand up," that is, retain its homogeneity and obviate the tendency to marginal icing that occurs with storage. It is represented that manufacturers not infrequently have to "hold over" goods under refrigeration for several days, or, in some instances, even a week or more, in order to await the arrival of favorable weather conditions.

Thus used, gelatine and other agents of this class, while unquestionably wholesome enough in themselves, yet because, as it is alleged, they render feasible the storage of ice cream for weeks, or even months, to this extent must be considered in the light of "mechanical" preservatives. Just how long a preparation of uncooked milk (containing possibly eggs) can be stored under refrigeration without undergoing decomposition, with the possible formation of toxic or otherwise objectionable products, involves a question that has neither been decided nor as yet given very extensive attention.

While it is a matter of common knowledge that any partial melting of ice cream followed by subsequent freezing, is to be avoided, yet one investigator claims he has found that in the case of ice cream maintained in a *solidly* frozen condition (not as packed for shipment) no deterioration occurs with storage. The United States Department of Agriculture is

now conducting investigations with reference to the effect of storage at low temperatures on milk and other foods rich in nitrogen intended to be consumed raw. Meanwhile, the substance of scientific opinion in this connection seems to be decidedly to the effect that any practice involving prolonged storage of this product, regardless of the conditions, should be discouraged. It is but due the manufacturer to state that, unlike the case of many perishable food products, there is no especial pecuniary benefit accruing from prolonged storage; on the contrary, the endeavor being in general to place this product before the consumer at the earliest practicable moment following its manufacture.

A large number of ice cream fillers are now on the market, the basis of the majority of these preparations being apparently gelatine or gum tragacanth. A compound of this nature recently brought to our attention is sold under the name of "Foamaline," and is said to consist of a mixture of gelatine, corn starch and arrowroot. But in the two samples of ice cream in the manufacture of which it was alleged that this product had been used, no starchy substance was found, the only adulterant detected being gelatine.

The complaint has been made, and with some justice, that, while the law compels ice cream vendors to sell a standard article as regards the fat content, nevertheless there is no law requiring the producer of the cream entering its composition to abide by any standard. While it is true that some cream is sold in New Hampshire that falls below the recognized standard, and while, in the case of an article now so extensively consumed, the enactment of a definite standard by the next Session is much to be desired, yet it is sufficiently evident that the larger cream producers are uniformly recognizing the 18 per cent. standard of the State Board of Health and of the federal government; furthermore, these producers are willing to sell cream on a definite guarantee as regards butter fat content.

That the absence of a specific legal standard for cream is not responsible for any considerable degree of embarassment on the part of ice cream dealers would seem to be indicated by the fact that, of the 66.2 per cent. representing samples that failed to comply with requirements, but 16.5 per cent. of the total, amounting to but 25 per cent. of the illegal, were so classed because of deficiency in butter fat content only. On the other hand, of the 78 adulterated samples 48, equivalent to 62 per cent. of such, were also deficient in butter fat content.

Following the enactment of a definite standard for ice cream, much interest has developed throughout the state as to how closely manufacturers and dealers were lending compliance, and in consequence this department has been called upon to give the matter a rather unduly large share of attention. Requests for analyses have been numerous, much

of the pressure coming from dealers who were conscientiously living up to the law and who justly expected us to compel their competitors to do likewise. For some time all of the leading dealers in the cities of Concord, Manchester and Nashua have been selling a legal product, and the figures given in the table for these cities refer mainly to samples collected from the smaller places, from push carts, etc.

In the city of Dover conditions are a little different. Here some local feeling between certain leading dealers who are complying with the law and certain others who are not, and who apparently refuse to be coerced into compliance by the former, seems to be at the bottom of the situation. A number of the latter assert that the product which they are offering to the public is "frozen pudding," and not ice cream. The intent in the use of this designation is obvious enough, as such mixtures are in no sense "frozen pudding," but in reality are nothing more than plain, substandard ice cream stiffened with gelatine and are sold in response to a call for ice cream. During the summer of 1907 complaints were filed against a number of Dover dealers, but on the advice of the local board these were not pressed at that time. During the past season the attempt was repeated, with the result that the defendants plead not guilty in the lower court, and the grand jury subsequently failed to find any indictments in these cases.

BEVERAGES.

Thirty-one samples have been examined, 18 of which were classed as illegal because of improper labeling or the presence of chemical preservatives. In none of these samples was saccharin detected, but a number contained benzoate of soda, salicylic acid and sulphurous acid. Under the law the two latter are prohibited in foods, regardless of labeling. One vendor of sweet cider containing benzoate, without notice thereof, has been prosecuted, as has also one grocer for the sale of a beverage preserved with salicylic acid.

Attention should be called to the manner of labeling now followed by the bottlers of the dyed concoctions sold as "tonics" and "soft drinks." As has been before pointed out, these preparations consist of nothing more than sweetened carbonated water colored with aniline dye and flavored with compounds prepared solely from chemicals. Bottlers are continuing to label such products in generous-sized type as "strawberry," "raspberry" and "blood orange," the only concession made to the food act being the statement in small type on the *cap* of the bottle: "Artificial color and flavor." This statement is so inconspicuous that it is undoubtedly hardly ever observed by the consumer — as it was expressly designed that it should not be. This manner of labeling is in violation of both federal and state regulations and will be held by this department as in violation of the law, pending decision by the courts.

BOTTLED BEVERAGES.

Brand.	Manufacturer or jobber.	Collected of	Remarks.
Royal Purple Grape Juice	Lawton Fruit Juice Co., Lawton, Mich.	F. H. English, Littleton	Preserved with benzoate of soda; illegal.
Superior Blood Orange	Standard Bottling Works, St. Johnsb'y, Vt.	E. L. Bonardi, Littleton	Heavily colored artificial product; misbranded.
Strawberry Soda	Ætna Bottling Co., Concord	Herbert Smith, Concord	Heavily colored artificial product; misbranded.
Blood Orange Soda	Pepperell Spring Water Co., Pepperell, Ms.	A. Clement, Concord	Heavily colored artificial product; misbranded.
Strawberry Soda	—— Bliss, Salem, Mass.	Cartland Gro. & Pro. Co., Dover	Artificially colored; sweetened with saccharin; misbranded.
Gifford Lime Juice	Haskell, Adams Co., Boston	E. E. Craig, Woodsville	Illegally preserved with salicylic acid.
Finaste Hallonsaft (Raspberry syrup)	Scandinavian Importing Co., Boston	H. H. Crockett, Concord	Preserved with salicylic acid; contains coal tar dye and artificial flavor.
Bowker's Conc. Lemonade	H. L. Bowker, Boston	C. F. Heath, Concord	Weak lime juice containing 2.06% citric acid. No preservatives. Questionable labeling.
Blood Orange Tonic	Granite State Bottling Co., Atkinson Depot	M. M. Blanchard, Concord	Highly colored chemical imitation; misbranded.
Nutfield Blood Orange Tonic	Lafayette Mineral Spring Co., W. Derry	Gale & Brown, Concord	Marked "artificial color and flavor" on the cap. Is a highly colored chemical imitation. Not properly labeled.
Nutfield Ginger Ale	Lafayette Mineral Spring Co., W. Derry	Gale & Brown, Concord	Marked "artificial color and flavor" on cap.
Nutfield Strawberry Tonic	Lafayette Mineral Spring Co., W. Derry	Gale & Brown, Concord	Marked "art. color and flavor" in small letters on cap. Is a highly colored chemical imitation. Not properly labeled.
Strawberry Soda	Ætna Bottling Co., Concord	J. E. Nolan, Concord	Marked "artificial" in small letters. Is a highly colored chemical imitation.
Nutfield Lemon Soda	Lafayette Mineral Spring Co., W. Derry	Shepard Bros., W. Concord	Marked "artificial color and flavor" in small letters on the cap. Not properly labeled.
Crescent Orangeade	Columbia Manufacturing Co., Chicago	Submitted from Concord	Powder consisting of artificially colored citric acid. Misbranded.
Rose Lime Juice	L. Rose, London, Eng.	Cater & Benfield, Portsmouth	Adulterated with sulphurous acid.
Lemonade	S. A. Riddle, Concord	S. A. Riddle, Concord	Not lemonade.
Rich Green Ginger Cordial	Mackie, Scott & Co., Leith, Scotland	Enterprise Gro. Co., Rochester	Preserved with salicylic acid.
Unfermented Grape Juice	Adolph Prince, New York	H. M. Hanson, Somersworth	Guaranteed "entirely free from alcohol." Contains 7.24% alcohol.

BAKING POWDER.

A baking powder to be of standard quality must contain not less than ten per cent. of available carbonic acid gas. Most of the goods of this class now on sale contain a statement relative to the character of the powder—information that should be available to every purchaser. One of the advertising practices of manufacturers of the cream of tartar variety is the representation that the use of any other kind of powder is to be avoided, on account of its alleged deleteriousness to health. But there is no good reason for believing that the cream of tartar powder is any more desirable from this standpoint than one prepared from acid phosphate. The common cheap powder of the market consists of a mixture of acid phosphate with alum as the acidic ingredient. From the standpoint of healthfulness an alum powder is less to be desired than one of the other classes. Such powders should sell for from ten to twenty cents a pound. When, therefore, the purchaser pays the price of a cream of tartar powder, receiving a pitcher or a preserving kettle in addition as a "present," he should understand not only that he is getting a cheap alum powder but that he has paid full value for the premium.

BAKING POWDERS BELOW STANDARD OR NOT PROPERLY LABELED.

Brand.	Manufacturer.	Collected of	Per cent. available gas.	Remarks.
Ocean.....	Ocean Mills, Montreal, Can	—— ——, Manchester...	7.70	Formula correct, but sample below standard.
Boston.....	Boston Baking Powder Co., Boston.....	F. H. English..... Littleton.....	9.49	Formula on bottom of can. Below standard.
Ritchie's.....	E. M. Ritchie, Groveton.	E.M. Ritchie, Groveton	8.54	No formula; below standard.
Golden Shield	Monroe Chemical Co., Fairport, N. Y.....	Estele & Delaney, Woodsville.....	9.54	Below standard. Formula does not show alum which is present.
Primo.....	Primo Baking Powder Co., Boston.....	C. F. Locke, Lakeport.	14.50	Represented as free from alum; contains alum.
Nolette's Favorite.....	F. X. Nolette, Somersworth.....	H. LaRochelle, Somersworth.....	8.16	No formula. Is an alum-phosphate powder. Below standard.

CREAM OF TARTAR.

Most of the cream of tartar now on the market is of a very satisfactory degree of purity. The fraudulent product of one firm, the J. Smith Brockway Co., Boston, Mass., was found enjoying an apparently extensive sale throughout the northern section of the state. This product, although

labeled as "Extra Fine Cream of Tartar, absolute purity," consisted for the most part of a mixture of gypsum acid phosphate of lime and starch. These samples were taken prior to October 1, under the old law which absolved the dealer from liability through the "knowingly" clause, although it is difficult to conceive of a mixture of this kind deceiving any grocer of experience.

ADULTERATED CREAM OF TARTAR.

Brand.	Manufacturer or jobber.	Collected of	Remarks.
Queen Quality	J. Smith Brockway Co., Boston	J. W. Kimball, Lancaster	A mixture of gypsum, acid phosphate and starch.
Star.....	J. Smith Brockway Co., Boston	E. M. Ritchie, Groveton	A mixture of gypsum, acid phosphate and starch.
Bulk, Extra Fine	J. Smith Brockway Co., Boston	E. M. Ritchie, Groveton	A mixture of gypsum, acid phosphate and starch.
Bulk.....	J. Smith Brockway Co., Boston	W. Kimball, Lancaster	A mixture of gypsum, acid phosphate and starch.
Bulk.....	J. Smith Brockway Co., Boston	Fred S. Linscott, Lancaster	A mixture of gypsum, acid phosphate and starch.

CATSUPS.

The New Hampshire law allows the use of benzoate of soda in quantity not exceeding 0.1 per cent., provided the presence of such is stated upon the label of the container. Not only is the present sentiment of food inspection officers practically unanimous in opposing the use of preservatives in this and other articles of food, but already three or four of the leading catsup manufacturers have declared themselves as done with antiseptics. It now seems probable that the only thing that will deter other concerns from eventually adopting the same practice will be either the lack of proper sanitary methods of manufacture, or the use of refuse material—or both.

CATSUPS AND TABLE SAUCES FOUND ILLEGAL.

Brand.	Manufacturer or jobber.	Collected of	Preservative.	Remarks.
Bulk.....	C. B. Emerson, Boston..	— —, Concord....	Benzoate of soda	
Montauk Point.	E. E. Clifford & Co., Portland	S. T. Martin, Groveton	Benzoate of soda	Illegally "sweetened with saccharin."
Our Favorite...	Erie Preserving Co., Buffalo, N. Y.	E. H. Bilodeau, Littleton	Benzoate of soda	Presence of benzoate undeclared.
Extra Fine.....	.....	F. H. English Litleton	Benzoate of soda	Colored with coal tar dye. Declaration obscure.
Van Camp.....	Van Camp Packing Co., Indianapolis	C. D. Steele & Co., Manchester	Benzoate of soda	Artificially colored.
Waw Waw.....	Waw Waw Ltd., London, Eng.	F. H. English, Littleton	Salicylicacid	Illegal.
.....	.....	Enterprise Grocery Co., Rochester	Benzoate of soda	Artificially colored; benzoate not declared.
Snider.....	Snider Preserving Co., Cincinnati	C. C. Schoolcraft, Concord	Benzoate of soda	Artificially colored; benzoate not declared.

CELERY SALT.

Our attention has been called to the character of the celery salt on sale. A standard preparation of this nature should consist only of table salt together with sufficient ground celery seed to impart the requisite flavor. There is no more justification for the addition of starch to such a mixture than there is in the case of ordinary table salt. The four brands of this preparation examined were all found to contain a large admixture of cereal starch.

ADULTERATED CELERY SALT.

Brand.	Manufacturer or jobber.	Collected of	Remarks.
Decanter.	Twitchell-Champlin Co., Portland, Me.	C. B. Whittredge, Concord	Shows much corn starch.
Crown....	Horton-Cato, Detroit, Mich.	H. N. Hanson, Somersworth	Shows much wheat starch.
Crown. ...	Horton-Cato, Detroit, Mich.	A. St. Laurent, Somersworth	Adulterated with wheat starch.
Colburn..	A. Colburn & Co., Philadelphia, Pa.	W. R. Morris, Epping	Adulterated with much corn starch.

MISBRANDED COFFEES.

There is now practically no adulterated coffee upon the market, the sale of mixtures including chicory and cereals being a thing of the past. A large amount of coffee of excellent flavor and of low price is now being imported from Central and South America. The principal problem in connection with the sale of these varieties is to prevent their being offered under improper geographical names.

The manufacturers of a few cereal substitutes still insist upon selling these preparations under the designation of "coffee," although the use of the latter word in connection with such is unwarrantable. While the labeling of the Digesto Brand of coffee, of the United States Coffee Refining Company, has been materially modified of late, this firm is still persisting in the liberal use of misleading newspaper advertising. Its president recently called at this office to protest against our attitude in the matter as preventing his company from doing any business in this state, and also to call our attention to the present comparatively moderate claims appearing upon the label. To our later criticism of the advertising running in the *Boston Transcript*, the company's president suggested that, "without in any way agreeing that you have the control over advertising in the newspapers of New Hampshire," nevertheless it was his intention to draw up some advertising and submit for our approval. In view of the fact that there is, unfortunately, at present no such thing as a legal censorship over newspaper advertising, this comes as a somewhat novel suggestion. Nevertheless it is in the right direction; to merit our good will, the sale of any article of food must be shorn of all forms of misrepresentation.

MISBRANDED COFFEES.

Brand.	Manufacturer or jobber.	Collected of	Remarks.
Detanated.....	Clark-Coggin & Johnson, Boston	— —, Concord.....	Mis branded. Contains normal amount of tannin.
Detanated.....	Clark-Coggin & Johnson, Boston	Estele & Delaney, Woodsville	Claims are fraudulent.
Café des Invalides.	S S. Pierce & Co., Boston	Jenness-Stevens Co., Dover	Contains chicory; claims fraudulent.
Digesto Coffee	U. S. Coffee Refining Co., New York	Jenness-Stevens Co., Dover	Misbranded.

CIDER VINEGAR.

Most of the vinegar now on sale appears to be properly branded upon the barrel. The price of cider vinegar has materially increased of late, with the result that jobbers are pushing the sale of vinegars made by the fermentation of low grade syrups or molasses house products. These are generally properly labelled by the jobber and are in every way wholesome preparations, but until the retailer is compelled to sell his goods for what they are, such labeling only amounts to protecting the latter's pocket The argument that "vinegar is vinegar and one kind is as good as another" is not true, and it is but right that the purchaser, as well as the grocer, should, for his own protection, have some means of knowing the grade and variety of goods with which his order is filled.

CIDER VINEGAR FOUND ADULTERATED OR BELOW STANDARD.

Manufacturer or jobber.	Collected of	Acidity per cent.	Solids per cent.	Remarks.
Farmers'.....	————, Plymouth.....	1.46	1.92	Below standard.
Twichell, Champlin Co., Portland, Me.	T. H. Samson, Berlin.....	3.77	0.26	Below standard and spurious.
Conant & Patrick, Portland, Me.....	F. W. Mildon, Wolfeboro	5.43	0.41	Spurious.
Farmers'.....	————, Franklin..... ..	5.81	0.80	Below standard.
....	————, Franklin.....	5.79	1.71	Not genuine.
Cross, Abbott & Co., White River Jc., Vt.	O. B. Pierce, West Lebanon.....	6.13	2.21	Spurious.
....	Whitcomb & Hasking, West Lebanon.....	5.76	1.55	Spurious.
Farmers'.....	Farwell's Creamery, Somersworth.....	3.51	2.95	Below standard.
....	Forwarded from Manchester.....	4.60	2.12	Spurious.
.....	Forwarded from Manchester.....	4.97	0.44	Spurious.
....	Forwarded from Manchester.....	5.24	2.14	Not pure cider vinegar.
Fleischmann Vinegar Works, N. Y.....	Joseph Lambert, Berlin.....	.....	.....	Distilled vinegar sold as cider vinegar.
.....	J. P. Boucher, Berlin.....	.....	....	Syrup vinegar sold as cider vinegar.
Horace Marshall, Manchester.....	P. F. Crenier, Manchester.....	4.39	2.46	Not genuine cider vinegar.
Farmers'.	Submitted from Concord.....	3.04	.....	Below standard.
.....	Lamoureaux Brothers, Manchester.....	4.70	1.53	Not genuine cider vinegar.
Horace Marshall, Manchester.....	H. A. Terrell, Manchester.....	4.31	2.01	Not genuine cider vinegar.
....	C. F. Locke, Lakeport.....	1.39	4.24	Below standard.
.....	Comire & Proulx, Franklin.....	4.96	2.16	Spurious; artificially colored.
Farmers'.....	Submitted from Concord.....	3.10	.....	Below standard.
C. B. Marshall, Nashua.....	F. A. Brown, Nashua.....	3.18	2.82	Below standard.
Farmers'.....	I. Cushing, Rochester.....	3.05	1.92	Below standard.
Farmers'.....	Submitted from Manchester.....	5.15	1.86	Below standard.
Farmers'.....	Gale & Brown, Concord	3.33	1.52	Below standard.

DRIED FISH.

No.	Brand.	Packer or Jobber.	Collected of	Remarks.
3688	Beardsley's Shredded Codfish.	J. W. Beardsley's Sons, New York..	Jet L. Bass, Lancaster.....	Preserved with benzoate of soda; contrary to claims.
3693	Hand lined Georges Codfish...	Pinkham & Foster, Gloucester, Mass.	J. W. Kimball, Lancaster...	Preserved with benzoate of soda.
3694	Sailor Georges Codfish.....	Packed at Gloucester, Mass.....	Guy Raymond, Lancaster..	Preserved with benzoate of soda.
3695	Jones' Celebrated Codfish.....	Alfred Jones & Sons, Bangor, Me....	Evans & Howe, Lancaster..	Guaranteed free from preservatives; contains borax.

No. 3693. Inspection of the large shipping case showed a label claiming the presence of 0.4 per cent. benzoate of soda. Label affixed to the retail package bore no reference to the presence of preservative, or no directions for the removal of such.

No. 3694. Label of package bore no mention of preservative, or directions for removal of such.

FLAVORING EXTRACTS.

Since January 1, 1907, a very noticeable improvement in the manner of labelling extracts has occurred. There is still some tendency to apply the fraudulent terms "concentrated," "triple strength," etc., to goods the quality of which but little if any exceeds the minimum requirements, but these exaggerations of the trade will doubtless disappear with time. In the better grades of most extracts, particularly that of lemon, there is a noticeable tendency to omit the once universal artificial coloring. In fact, this may be accepted to some extent by the purchaser as a guide to quality, as the cheapest extracts are almost invariably richly colored.

In the case of vanilla extract, the standard requires that one hundred parts by volume of the extract shall contain the soluble matters from ten parts by weight of vanilla beans. Where a smaller quantity of extractive matter is present, the product is not entitled to be labelled as "extract of vanilla," unless the proportion of standard strength is plainly stated. Thus one sample purporting to be "extract of pure vanilla," was labeled as containing "twenty-five per cent. of alcohol saturated with pure vanilla beans." Naturally this extract was not found to be of standard quality. Purchasers should beware of goods of this class; to the manufacturer there is more profit in them than there is in a straight extract, from which it of course follows that in purchasing the former the consumer is receiving less value for his money.

The practice is now obtaining with the manufacturers of the better grade of extracts of selling such under a measure guaranty. Where no definite measure is specified upon the label or carton, purchasers should inspect the container carefully, as the well-known trade practice of using bottles of one ounce capacity in apparent two-ounce size still exists to some extent. A large proportion of the samples were found to be short five or ten per cent. of the measure claimed. This is probably not in most cases due to any dishonest intent on the part of the manufacturer, but rather may be ascribed to an over-zealous practice of strict business economy.

In the case of some brands found to be seriously deficient in guaranteed measure, subsequent inspection of other samples indicated no uniformity of volume, the latter running in some cases as much above the measure claimed as in others it did below. In such instances also the integrity of the manufacturer is not so much to be questioned as his willingness to put out his products in a cheap, crudely-made bottle. In this connection, Regulation 24 (b), (identical with a federal regulation), relative to the law effecting statement of weight or measure, provides that due allowance shall be made for the "reasonable variations which attend the filling and weighing or measuring of a package." The determination of exactly what

shall be considered as the maximum for a "reasonable variation" in connection with the filling of extract bottles is yet to be made. Where an extract is put out under a definite guaranty of measure it would seem that a maximum deviation from such guaranty of 10 per cent (representing a possible total range of variation in the bottle size of 20 per cent.) is the most that the manufacturer could reasonably expect, or wish to tolerate. Certainly, in justice to the average consumer, whose needs are ordinarily supplied for some time by a single bottle, 10 per cent. is the most that should be allowed. Pending a formal decision, in the future when the deviation from the guaranty in the case of a single package amounts to as much as 25 per cent., this department will feel justified in deeming such as a violation of the law meriting prosecution. The latter will of course also be true in the cases of extracts that exhibit a uniform deficiency, though such amount to much less than the above.

LEMON EXTRACTS FOUND ADULTERATED OR BELOW STANDARD.

Brand.	Manufacturer.	Collected of	Alcohol per cent. by vol.	Lemon oil per cent.	Remarks.
St. John's		Concord			Contains no lemon oil.
	J. Smith Brockway, Boston	F. H. English, Littleton	47.6	0.00	Contains no lemon oil; fraudulently labelled.
Gale & Brown's		Gale & Brown, Concord		4.40	Below standard.
Lemon Extract	White & Co., Boston.	Lee Brothers, Concord		trace	Imitation.
Lemon Extract	Peddled	Keene		3.09	Below standard.
Colton's Lemon	J. W. Colton, Westfield, Mass.		87.2	6.08	Not "triple strength" as claimed.
Extract Lemon.	Grand Union Tea Co., New York		77.2	5.65	Standard quality; short measure.
Rigby's Extract Lemon	R. G. Leighton, Portland, Me.	T. J. Bickford, Berlin		0.50	Shows formula containing 8 per cent. lemon oil; misbranded.
Burlington Extract Lemon.	Burlington Ext. Co., Burlington, Vt.	Harrington & Co., Littleton		0.19	Sample is an imitation.
Extract Lemon	J. Smith Brockway, Boston	Carrington & King, Berlin		0.00	Contains no lemon oil; fraudulently labelled.
O. K. Lemon	New York Ext. Co., Earlville, N. Y.	Harrington & Co., Littleton	25.1	0.00	Sample is an imitation; short measure.
Concentrated Ext. Lemon	None given	Cartland Gro. & Prov. Co., Dover.	15.1	0.22	Sample is an imitation.
Pure Extract Lemon	C. W. Bangs, Lisbon	J. C. Pillsbury, Whitefield	80.0	5.50	Short measure; standard quality.
Blend Extract Lemon	Howard Extract Co., Dover	Submitted from Durham	37.0	0.00	Misbranded.
Conc. Pure Extract Lemon.	Abbott Chemical Works, Salem, Ms.	Jenness-Stevens Co., Dover	31.2	0.10	Sample is an imitation.
*Extract Lemon	St. John & Co., New York	McQuesten & Lewis, Manchester.			Misbranded; formula on back indicates an imitation.
Pure Extract Lemon	Slater Extract Co., Pawtucket, R. I.	Martin McIntyre, Manchester.	36.7	0.10	Sample is an imitation.
Manhattan Club Pure Ext. Lemon	J. H. Folkins & Co., Boston	M. D. Knox, Manchester	89.3	4.50	Slightly below standard.
†Extract Lemon	Schlotterbeck & Foss, Portland, Me.	Union Grocery Co., Manchester	81.5	5.20	Artific'ly colored as represented.
Folkins' Conc. Ext. Lemon	J. H. Folkins & Co., Boston	Omer Legare, Manchester	72.5	1.56	Below standard; shows formula.

LEMON EXTRACTS FOUND ADULTERATED OR BELOW STANDARD.—*Concluded.*

Brand.	Manufacturer.	Collected of	Alcohol per cent. by vol.	Lemon oil per cent.	Remarks.
W. P. Baker's	W. P. Baker, New York	E. L. Cram, Lakeport	51.04	0.03	Artificially colored imitation.
Kidder's	Kidder & Co., Boston	E. L. Cram, Lakeport	69.44	1.12	Below standard; artificially colored.
Mutual	Mutual Mfg. Co., New York	E. D. Begin, Laconia	58.30	0.30	Imitation.
Premier	F. H. Leggett & Co., New York	J. P. Smith, Laconia		3.80	Below standard.
Forest City	Forest City Extract Co., Portland	Shepard Grocery Co., Franklin	36.58	0.30	Imitation.
Hull's	G. S. Hull & Co., Lowell, Mass	F. M. Morse & Co., Penacook	37.03	3.47	Below standard.
Hoagland's	R. P. Hoagland, Boston	F. M. Morse & Co., Penacook	50.47	0.20	Imitation.
Kimball's	Kimball Bros., Enosburg Falls, Vt.	F. M. Morse & Co., Penacook	76.78	4.06	Below standard; artificially colored.
Good Value	Mfd. corner State and Lewis Sts., Binghamton, N. Y.	A. A. Woods, Nashua	47.78	0.10	Imitation.
Green Mountain	Kimball Bros., Enosburg Falls, Vt.	A. A. Woods, Nashua	64.89	0.90	Very weak.
L. & L	Danvers Extract Co., Danvers, Mass.	A. A. Woods, Nashua	75.27	3.20	Below standard.
Leighton's	R. G. Leighton, Portland	E. F. Tessier, Nashua	82.04	6.76	
Rigby's	Rigby Extract Co., Portland	E. F. Tessier, Nashua	66.61	1.20	Below standard.
Gilt Edge	Anderson & Edwards, New York	F. M. Hanson, Somersworth	51.48	0.00	Imitation.

* Bore the formula on the back of the carton: "70 parts hydro-alcoholic solution of lemon; 30 parts aqua; colored artificially with tumeric." This formula contains no information whatever with regard to strength.

† Labelled "Highly concentrated, triple strength, colored." This amounts to misbranding, as the sample is not "highly concentrated" or "triple strength."

ADULTERATED VANILLA EXTRACTS.

Brand.	Manufacturer.	Collected of	Vanillin, per cent.	Coumarin.	Remarks.
ɔhn's.....	Not given.....	M. A. Kenna, Concord	.....	Present	Artificially colored.
er's Conc....	Kidder & Co., Boston	Beattie & Co., Woodsville	0.250	Present	Misbranded; sample is an imitation.
ıct Vanilla...	J. Smith Brockway, Boston	Carrington & King, Berlin	0.250	Present	Misbranded; sample is an imitation.
. .....	C. W. Bangs, Lisbon	J. C. Pillsbury, Whitefield	0.137	None	Standard quality; short measure.
. Extract....	Not given.....	Cartland Grocery, Dover	0.000	Present	Misbranded; sample is an imitation.
Conc. Ext...	Slater Extract Co., Pawtucket, R. I.	Martin McIntyre, Manchester	0.187	Present	Misbranded; sample is an imitation.
ıattan Club..	A. H. Folkins & Co., Boston	Jenness-Stevens Co., Dover	0.062	None	Questionable labeling; not a full strength extract.
ıct Vanilla...	Gt. Atl. & Pac. Tea Co., New York	.....	0.087	None	Artificially colored.
ɔn's Vanilla..	J. W. Colton & Co., Westfield, Mass.	.....	0.150	None	Not "triple strength," as claimed.
lla Frostlene	Frostlene Mfg. Co., Boston	E. L. Cram, Lakeport	0.025	None	Artificial.
l.....	Regal Ext. Co., Boston	P. Gahagan, Franklin	0.200	Present	Artificially colored; contains artificial vanillin.
Silver King.	Habberstadt Co., New York	Sanborn Bros., Penacook	0.100	Much	Artificially colored; adulterated with coumarin.
ıton's	R. C. Leighton, Portland	E. F. Tessier, Nashua	0.125	None	Adulterated with fruit juice.
ett's.....	G. B. Bennett & Co., Brockton, Mass.	H. Jeanotte, Nashua	0.137	None	Adulterated with fruit juice.
ıct Vanilla...	G. H. Lowell & Co., New York	Sub. from Concord..	0.275	None	Artificially colored.

ORANGE EXTRACTS FOUND ADULTERATED OR BELOW STANDARD.

Brand.	Manufacturer.	Collected of	Alcohol, per cent.	Oil, per cent.	Remarks.
rs' Ext. Orange.	Rogers Tea & Coffee Co., New York	Agency, Manchester	57.3	0.37	Imitation.
n's Ext. Orange	J. W. Colton & Co., Westfield, Mass.	.....	79.3	5.64	Not "triple strength," as claimed.
ːh Ext. Orange..	Lewis DeGraff & Son, New York	....	71.9	4.26	Below standard.
ɜlood Orange...	Mutual Mfg. Co., New York	E. D. Begin, Laconia	.....	0.96	Very weak and artificially colored.
ɔct of Orange...	R. G. Leighton, Portland, Me.	E. F. Tessier, Nashua	88.5	4.76	Below standard.
ct of Orange....	Gowing Extract Co., Reading, Mass.	A. B. Slawsby, Nashua	76.9	2.50	Below standard.

PEPPERMINT AND WINTERGREEN EXTRACTS FOUND ADULTERATED OR BELOW STANDARD.

Brand.	Manufacturer.	Collected of	Alcohol, per cent	Oil, per cent.	Remarks.
Grand Union Essence of Peppermint	Grand Union Tea Co., New York	Sub. from Concord..	54.8	3.20	Standard quality; short measure.
Grand Union Essence of Wintergreen	Grand Union Tea Co., New York	Sub. from Concord..	62.1	3.25	Standard quality; short measure.
Standard Peppermint	Standard Extract Co., Boston	A. A. Woods, Nashua	.....	0.50	Very weak; artificially colored.
Tropical Ext. Peppermint	Potter-Parlin Co., New York	F. A. Walch, Nashua	.....	trace	Artificially colored peppermint water.
Ext. of Peppermint..	St. John & Co., New York	H. C. Sturtevant & Son, Concord	.....	1.6	Below standard.
Ext. of Peppermint..	Williams & Carleton, New York	Gale & Brown, Concord	.....	0.50	Very weak; below standard.

IMITATION FRUIT FLAVORS NOT PROPERLY LABELED.

Brand.	Manufacturer.	Collected of	Remarks.
Champion Ext. Strawberry..	N. Y. Extract Co., New York..	Beattie & Co., Woodsville..	Misbranded.
Red Seal Conc. Ext. Strawberry	Red Seal Co., Lowell, Mass....	N. P. Morin, Manchester....	Misbranded.
Herrick's Ext. Strawberry..	C. P. Herrick, Tilton.....	Batchelder Bros., Tilton....	Misbranded.
Compound Strawberry.....	Boston Baking Powder Co., Lowell, Mass.	Fifield Bros., Tilton.....	Misbranded.
Conc. Extract Peach.....	G. S. Hull & Co., Lowell, Mass.	A. A. Woods, Nashua.... ..	Misbranded.

GLUTEN FLOURS.

A number of samples of gluten flours and alleged starchless preparations were examined. Four of these flours were found to be fraudulent, the composition in such cases not varying essentially from that of an ordinary whole wheat flour. The standard for gluten flour requires not less than 35 per cent. of proteids. Further discussion of this subject will be found elsewhere in the report.

GLUTEN FLOURS FOUND TO BE MISBRANDED OR BELOW STANDARD.

Article.	Manufacturer.	Collected of	Protein, per cent.	Remarks.
well & Rhines ..	Farwell & Rhines, Watertown, N. Y.	Sub. from Henniker ..	12.88	Fraudulent; differs but little from ordinary wheat flour.
rdsley's	Beardsley & Son, Watertown, N. Y.	Sub. from Henniker ..	15.31	Fraudulent; ordinary whole wheat flour.
ıdard Gluten...	Johnson Educat. Food Co., Boston	Jenness-Stevens Co., Dover	27.44	Below standard.
sco Flour.....	Farwell & Rhines, Watertown, N. Y.	Sub. from Manchester	10.68	Misbranded.

HORSERADISH.

Complaints have been received of horseradish on sale alleged to be adulterated with turnip. Investigation showed that while in all cases the goods were free from adulterants, the normal degree of pungency was lacking. It would seem to be impossible to retain the latter in the case of goods packed in vinegar and sealed in the usual way, for more than a very few weeks.

HONEY.

Of late the manufacture and sale of artificial honey has become somewhat extensive in Europe, but though found elsewhere in this country in a few cases, no samples have as yet been found in New Hampshire. This product is made by heating a concentrated solution of common sugar with a trace of tartaric acid until the former is completely decomposed into invert, or "fruit" sugar, and subsequently adding a small amount of genuine honey to improve the flavor.

One sample, the product of the W. J. Lamb Company, Somerville, Mass., was found to be misbranded in that it was erroneously labeled as "Orange Bloom."

MAPLE PRODUCTS.

No adulteration was detected in the case of any of the maple syrup samples examined. The attention of dealers is called to the standard for this product, which requires that such shall contain not more than 32 per cent. of water. Syrup of this consistency will weigh approximately eleven pounds to the gallon.

One firm, an old offender, whose methods were conspicuously illustrated in the July, 1906, issue of the *Bulletin*, has at last deemed it advisable to

put out only genuine maple goods under this name. But as indicated in the January number, this firm is continuing to deceive its patrons in that its product is far below standard weight. While inspection seems to indicate that there are some dealers willing to exploit an article of this nature, the purchaser should understand that in buying a standard brand he is getting approximately a third more value than in the present case.

During the period just preceding the maple season a large proportion of the fruit and confectionery dealers of the state make a practice of selling an imitation sugar, consisting of an artificially flavored mixture of cane or brown sugar, with from about twenty-five per cent. to none of maple sugar. While some of this product is put out by manufacturers in cases variously labeled "Blended," "Compound," etc., with the more or less honest intention of having it sold for what it is, nevertheless the evidence is that some of these dealers have fallen to the temptation of offering it to their customers as genuine maple sugar, in direct violation of the law. One dealer was found who received this product in bricks wrapped with a paper bearing a formula, and who appeared to be making a practice of removing this wrapper before offering the goods for sale.

MAPLE AND OTHER SYRUPS FOUND MISBRANDED OR BELOW STANDARD.

Brand.	Manufacturer.	Collected from	Remarks.
n Maple Syrup.....	Huntington M. S. & S. Co., Brattleboro, Vt.	Portsmouth.....	Illegally labeled; not pure maple.
Orchard Sap Syrup	Simpson Spring Co., South Easton, Mass.	Manchester.....	Compound 40 per cent. maple; contains not over 20 per cent. maple.
ermont Maple Syrup	Colman Coöperative Co., Quincy, Mass.	Concord.....	Wholly cane syrup; fraudulent (old goods).
eaf Syrup.....	Huntington M. S. & S. Co., Providence, R. I.	Concord.....	Compound 25 per cent. maple.
nsfield Fancy Syrup	C. M. Tice & Co., Boston ...	Concord.....	Compound 50 per cent. maple; contains not over 15 per cent. maple.
Brand Extra Quality Maple Syrup	C. A. Weston, Portland, Me.	J. E. Parent, Berlin...	Misbranded; formula incorrect.
nsfield Pure Fancy Syrup	Bay State Maple Sugar Co., Boston.	J. E. Parent, Berlin...	Claims 50 per cent. maple, 50 per cent. cane syrup; fraudulent.
Brand Maple Sap Syrup	Simpson Spring Co., South Easton, Mass.	F. H. English, Littleton.	Misbranded.
und Maple Syrup...	W. J. Lamb Co., Somerville, Mass.	Jenness-Stevens Co., Dover.	Misbranded.
ire Maple Syrup....	Simpson Spring Co., South Easton, Mass.	Jas. R. Yeaton & Co., Portsmouth.	Misbranded; formula incorrect.
nsfield Pure Fancy Syrup	Bay State Maple Syrup Co., Boston.	Jas. Costakos, Manchester.	Claims 50 per cent. maple, 50 per cent. cane syrup; fraudulent.
nsfield Pure Fancy Syrup	Bay State Maple Syrup Co., Boston.	O. McDuffee, Manchester.	Claims 50 per cent. maple, 50 per cent. cane syrup; fraudulent.
aple Syrup.....	W. J. Lamb & Co., Somerville, Mass.	Arthur Booth, Concord.	Genuine maple, but below standard weight.
nsfield Fancy Quality Syrup	Curtice & Co., Boston	F. P. Johnson, Manchester.	Claims 50 per cent. maple, 50 per cent. cane syrup; fraudulent.
Label Pure Vermont	Simpson Spring Co., South Easton, Mass.	.....	Genuine; slightly below standard.
m.....	Austin Nichols & Co., New York.	....	Genuine; slightly below standard.

MAPLE PRODUCTS MISBRANDED OR SOLD AS GENUINE.

Manufacturer.	Collected of	Remarks.
C. M. Tice & Co., Boston..	Antonio Palisi, Concord.	Shipping case labeled "Blended sugar, made of maple and cane sugars." Analysis shows but little maple sugar. Sold as maple sugar candy.
C. M. Tice & Co., Boston..	Antonio Palisi, Concord.	Shipping case labeled "Compound sugar, made from maple and cane sugar. Analysis shows but little maple. Sold as maple sugar candy.
C. M. Tice & Co., Boston..	Antonio Palisi, Concord.	Shipping case labeled "Cane and maple flavor." Sold as maple sugar candy.
Bay State Maple Syrup Co. Boston.	Jos. Gregoire, Somersworth.	Labeled "Blended sugar, compounded of cane sugar, with maple sugar as flavoring." Sample contains no maple sugar.
Bay State Maple Syrup Co., Boston.	Rumazza Bros., Rochester.	Shipping case labeled "Compounded of cane and maple sugars." Sold as maple sugar. Sample almost wholly cane sugar.
.....	J. Raffaelli, Tilton.	Mainly cane sugar. Sold as maple sugar.
....	Bert Raffaelli, Tilton.	Mainly cane sugar. Sold as maple sugar.
....	Bert Raffaelli, Tilton.	Sample almost wholly cane sugar. Sold as maple sugar.
Vermont Farmers' Co., Springfield, Mass.	Bert Raffaelli, Tilton.	Sample sold as maple. Printed wrapper, removed before sale, bore formula claiming 25 per cent. maple.
Bay State Maple Sugar Co., Boston.	Arthur Dedes, Portsmouth.	Box labeled "Sugar of maple flavor." Sold as maple sugar. Almost wholly cane sugar.
Chas. Lawrence & Co., Boston.	John M. Pearson, Portsmouth.	Box labeled "Sugar scallop." Sold as maple sugar. Almost wholly cane sugar.
Frank Whitcher, Ayer, Mass.	Boston Fruit Co., Dover.	Sold as maple sugar. Almost wholly cane sugar.
W. J. Lamb, Somerville, Mass.	Z. Bacigalugio, Manchester.	Box labeled "Mixture cane and maple sugar." Sold as maple sugar. Almost wholly cane sugar.
E. E. Post Co., Utica, N. Y.	Forwarded from Manchester.	Article labeled "Maple butter." Misbranded.

MOLASSES.

Evidence was found in seven cases of the sale by grocers of glucose mixture for molasses. Until the retailer is compelled to affix a paster to the jug or can setting forth the character of the goods with which such container has been filled, this practice is bound to be a common one. It needs to be borne in mind, however, that the mere affixing of a label of this character is not in itself sufficient to legalize the sale of a glucose mixture if molasses has been called for and no explanation made.

GLUCOSE—MOLASSES MIXTURES FOUND TO BE ILLEGALLY SOLD AS MOLASSES.

Jobber.	Collected of	Remarks.
Fletcher & Co., Portland, Me.	Submitted from Wolfeboro.	Contains glucose.
Conant & Patrick, Portland, Me.	Submitted from Wolfeboro.	Contains glucose.
Twitchell-Champlin Co., Portland, Me.	G. R. Dancourt, Berlin.	Sold as molasses; hogshead labeled "Molasses and Corn Syrup."
Milliken-Tomlinson Co., Portland, Me.	Malloy Bros., Berlin.	Sold as molasses; hogshead labeled very obscurely "Molasses and Corn Syrup."
.....	J. E. Parent, Berlin.	Sold as molasses; admitted to be a glucose mixture.
Milliken-Tomlinson Co., Portland, Me.	F. S. Linscott, Lancaster.	Sold as molasses; label shows "15 per cent. glucose, 15 per cent. sugar syrup, 70 per cent. molasses."
Milliken-Tomlinson Co., Portland, Me.	J. W. Kimball, Lancaster.	Sold as molasses; hogshead labeled "Pure Molasses and Corn Syrup."

SULPHUROUS ACID AND METALLIC IMPURITIES IN MOLASSES.

The following table shows the amounts of sulphurous acid and metallic impurities found in samples of molasses received during 1906. Stock from all the leading jobbers is included.

No.	Brand.	Sulphurous acid. Per cent.	Zinc oxide. Per cent.	Tin oxide. Per cent.
2775	50c	0.032	Present	
2780	34 New Orleans	0.028	Present	
2774	50c	0.027	Present	
2777	60 Tiger	0.005	None	
2772	50c	Much	Present	
2781	50c	0.036	Present	
2784	25c	0.018	None	
2666	Karo Syrup	0.032		
2995*	Dark Brown Sugar	0.003	None	Faint trace.
2994	Light Brown Sugar	None	None	Faint trace.
2996	Granulated Sugar,	None	None	None.
2997	Granulated Sugar	None	None	None.

SULPHUROUS ACID AND METALLIC IMPURITIES IN MOLASSES.—*Concluded.*

No.	Brand.	Sulphurous acid. Per cent.	Zinc oxide. Per cent.	Tin oxide. Per cent.
2991	55 Porto Rico	0.082	0.018	0.000
2992	60c	0.094	0.000	0.0024
2998	60 Ponce	0.022	Trace	Trace
2990	50 Porto Rico	0.005	0.009	0.005
2878	60c	0.053	0.012	None.
2879	50c	0.053	0.022	None.
2877	60	0.009	None	Considerable.
2875	50	0.002	None.	None.
2874	50	0.006	0.028	0.006
2873	40	0.045	0.022	None.
2872	35c	0.045	0.030	Considerable.
2871	50c	0.023	Trace	None.
2869	35 Texas	0.017	None	None.
2868	50 New Orleans	0.054	0.0625	None.
2867	45	Considerable	None	None.
2866	40	0.019	0.0125	None.
2865	50	0.063		
2864	50c	0.019	Undetermined	Undetermined.
2863	50c	0.027	Undetermined	Undetermined.
2862	45c	0.024	Undetermined	Undetermined.
2844	F. P.	0.028	Undetermined	Undetermined.
2786	60c	0.004	None	
2785	48c	0.064	Present	
2784	25c	0.018	None	
2876	40c	0.078	0.030	
2779	45 Porto Rico	0.012	Present	
2773	45c	Present	Present	
2762		0.053	Present	
2776	45c	0.012	None	
2782	50c	0.004	None.	
2870	60c	0.019	0.015	
2783	50c	0.042	Present	
2778	50 Porto Rico	0.027	Present	

* In comparison with the molasses, it will be observed that the brown sugars are practically free from impurities, while the granulated samples do not show a trace of any such.

PEPPER.

Recently a chemical and microscopical examination has been made of most of the brands of pepper now on sale in this state. The results are very gratifying. In no case was a sample encountered containing any foreign adulterant and in the majority of cases these goods were found to be very clean and of excellent quality.

The practice is now common of stating the net weight upon the carton; in no instance where this was done in the cases of the brands here given was such found to vary appreciably from the weight claimed. In view of the modern facilities available for automatic filling and weighing of packages, there would seem to be no good reason why this should not be done in all cases—unless it be that certain manufacturers are seeking to gain a trade on "cut-rate" goods put out in cartons slightly smaller than the conventional quarter-pound size.

SPICES FOUND ADULTERATED.

Article.	Manufacturer.	Collected of	Remarks.
Black Pepper.....	Berry-Dodge & Co., Newburyport, Ms.	——, Concord..	Contains excess of pepper shells.
Warranted Pure Pepper.....	Berry-Dodge & Co., Newburyport, Ms.	—— —, Groveton	Contains excess of pepper hulls.
Absolutely Pure Cinnamon..	Edwin J. Giles & Co., New York	Pope & Jackson, Woodsville	Not first-grade cinnamon.

ADULTERATED PICKLES.

Brand.	Manufacturer.	Collected of	Remarks.
Bunker Hill Sweet Pickles	Skilton-Foote & Co., Boston	Bailey & Rogers, Tilton	Pres. with benzoate of soda; sweetened with saccharin.
N. E. Sweet Gherkins	E. G. Dailey & Co., Detroit, Mich.	Bailey & Rogers, Tilton	Pres. with benzoate of soda; sweetened with saccharin.
Bunker Hill Sweet Gherkins	Skilton-Foote & Co., Boston	F. H. English, Littleton	Contains alum; sweetened with saccharin.
Bulk Sweet Pickles..	Not given.....	E. E. Craig, Woodsville	Sweetened with saccharin.
Sweet Mixed Pickles	....	M. D. Knox, Manchester	Pres. with benzoate of soda; sweetened with saccharin.
Sweet Mixed Pickles.	Worcester Spec. Co., Worcester, Mass.	Des Roches & Vezina, Manchester	Pres. with benzoate of soda; sweetened with saccharin.
Bunker Hill Sweet Mixed Pickles	Skilton-Foote & Co., Boston	Gorman Bros., Manchester	Pres. with benzoate of soda; sweetened with saccharin.

ADULTERATED AND MISBRANDED PRESERVES.

Article.	Manufacturer.	Collected of	Remarks.
Apple Jelly, Currant Flavor	Logan, Johnson & Co., Boston	——, Lebanon....	Pres. with benzoate of soda. Not stated on label.
Raspberry Preserve.	Ayer Preserving Co., Ayer, Mass.	——, Manchester	Mainly apple stock. Illegally labeled.
Raspberry Jelly.....	E. D. Petengill Sons, Portland, Me.	T.J.Bickford, Berlin	Misbranded. Sample largely apple stock.
Quaker Currant Jelly	John Boyle, Baltimore	T.J.Bickford, Berlin	Misbranded. Contains little if any currant.

DRUG INSPECTION.

As in the past, food and other lines of inspection have claimed the larger share of the time available. However, judging from the findings on the samples collected, it is evident that the drug trade should not be neglected in this connection.

Following the passage of the Food and Drug Law the proper labeling of proprietaries received very prompt attention at the hands of manufacturers, and it is now the exception to find a preparation of this character the label of which does not at least contain a statement of the ingredients in so far as is required by law, although there is still abundant room for improvement as regards observance of the "false and misleading" clause. We also find that many druggists are not exercising sufficient care in having such products as are prepared by themselves in conformity with the standards.

An interesting comparison is afforded of the relative quality of the average grocery store pharmaceutical as contrasted with that of the druggist. Many grocers carry such preparations as spirits of camphor, tincture of iodine, camphorated oil, essence of peppermint and the like. Such articles, really the legitimate stock of the druggist only, are usually supplied by some wholesale house and are designed, to a considerable extent at least, to compete with the druggist's product through the fact that the grocer can generally offer them for less money.

But the evidence is that probably 90 per cent. at least of these preparations fall far short of compliance with the U. S. Pharmacopœia. The two grocery store samples of camphorated oil, for instance, contained but 3 and 7 per cent., respectively, of camphor, whereas the standard requires 20 per cent.

In no cases have the so-called essences of peppermint and wintergreen ever been found to comply with the standard, it being nothing unusual for the amount of oil present to be but 10 or 20 per cent. of the U. S. P. requirement. Another point to be considered is the fact that there are

usually a number of grades of the same variety of oil of widely varying quality and cost, and while the reputable druggist will find it to his advantage to employ only a standard article, the purveyor to the grocery trade has no incentive for supplying anything better than is apt to be demanded by the undiscriminating purchaser of grocery store drugs. In consequence, while such purchaser may be able to buy a certain preparation for one half to three quarters what would be paid at the drug store, the actual value received may not be more than one tenth of that from the latter source.

It is only just to state that in the future grocers who wish to carry a stock of U. S. P. preparations may expect to be held to the same requirements as are druggists.

During the period covered by this report, 132 samples of drugs have been examined, 82 of which, equivalent to 62.1 per cent., failed to conform to requirements. In addition, a number of toilet articles and other proprietaries have been analyzed. Two dealers have been prosecuted for the sale of spurious products. The results of the inspection are shown in the following table:

SUMMARY OF DRUG INSPECTION.

	Total.	Illegal.	Per cent. illegal.
Alcohol	2	0	00
Cera Alba	4	2	50
Cera flava	3	0	00
Black Antimony	12	12	100
Spiritus gaultheriæ	8	6	75
Spiritus menthæ pipertæ	19	16	84
Linimentum camphoræ	7	6	86
Liquor calcis	16	5	31
Spiritus camphoræ	16	9	56
Spiritus frumenti	4	4	100
Sulphur præcipitatum	9	2	22
Sodiiboras	1	0	00
Potass. bitart	1	0	00
Tinct. ferri chloridi	8	4	50
Tinct. iodi	22	16	72
Total drugs	132	82	62.1
Hair tonics, proprietaries, etc	40		
Total	172		

CERA ALBA.

Two of the four samples of this product examined were found to be adulterated with paraffin. Until recently very much of the white wax on sale has consisted either wholly or very largely of the latter substance.

WHITE BEESWAX FOUND ADULTERATED.

Dealer.	Refract. at 65°.	
E. C. Atwood, Penacook.....	28.5	Adulterated with paraffin.
A. A. Faulkner, Rochester.....	18.0	Mainly paraffin.

BLACK ANTIMONY.

Until recently none of this product as on sale in New Hampshire was genuine. The samples examined were found to consist of a mixture in varying proportions of powdered coal and marble dust, a product totally inert as far as medicinal value is concerned. While it is true that the use of this preparation is confined principally to veterinary practice, and the sale of such is not extensive, yet this should afford no excuse to any reputable druggist for condescending to offer such a product,—notwithstanding that we have been criticised by one prominent druggist who did carry it, and, incidentally, who understood perfectly well its fraudulent character,—for "bothering with horse medicine." The deliberate sale of products such as this and imitation whiskey are good examples of the fact that an evil widely practised ceases to be an evil.

BLACK ANTIMONY.

Dealer.	Soluble in hydrochloric acid, per cent.	Antimony sulphide, per cent.	Remarks.
C. W. Plummer, Lakeport.....	58	None..	A mixture of powdered coal and marble dust.
C. P. Herrick, Tilton.....	71	1.90	A mixture of powdered coal and marble dust. Contains a trace of antimony.
I. S. Jackman, Franklin.....	47	None..	A mixture of powdered coal and marble dust.
A. E. Wallace, Nashua.....	62	0.12	A mixture of powdered coal and marble dust.
West Pearl Street Pharmacy, Nashua.	63	None..	A mixture of powdered coal and marble dust.
G. W. Shaw, Rochester.....	27	None..	Mainly coal dust.
Jos. F. Cassidy, Rochester....	75	Trace..	A mixture of powdered coal and marble dust.
R. D. Burnham, Rochester....	3	None..	Consists almost wholly of powdered coal.
John B. Morin, Somersworth..	62	Trace..	A mixture of powdered coal and marble dust.
H. S. Sanborn, Concord.....	51	None..	A mixture of powdered coal and marble dust. New stock; no guarantee exacted.
W. P. Underhill, Concord.....	25	None..	A mixture of powdered coal and marble dust.
D. F. Giles & Co., Concord....	44	None..	A mixture of powdered coal and marble dust.

SPIRITS MENTHÆ PIPERITÆ AND SPIRITS GAULTHERIÆ.

The eighth revision of the U. S. Pharmacopia does not recognize the designation "essence." Consequently the latter has no longer any legal standing. But that for most purposes the term "spirits" and "essence" as applied to the alcoholic solution of an essential oil are synonymous, and are so regarded by druggists, is evident from the fact that the majority of samples of these preparations were supplied by the druggist under an "essence" label in response to the call for "spirits," and that most of such did not fall very far short of compliance with the official standard for spirits.

SPIRITS OF WINTERGREEN FOUND BELOW STANDARD.

Dealer.	Methyl alcohol.	Oil, per cent.	Per cent. of U. S. P. requirement.	Remarks.
P. Gahagan, Franklin.....	None..	0.5	10.0	Manufactured by Burlington Extract Co., Burlington, Vt.
Sanborn Bros., Penacook..	None..	1.0	20.0	Manufactured by Hall Extract Co., Portland, Me.
E. L. Cram, Lakeport.....	None..	1.9	38.0	
C. W. Plummer, Lakeport.	None..	4.0	80.0	
C. P. Herrick, Tilton.....	None..	12.0	240.0	Not U. S. P.
E. C. Atwood, Penacook...	None..	23.0	460.0	Not U. S. P. Corresponds to the British or German "essence."

SPIRITS OF PEPPERMINT FOUND BELOW STANDARD.

Brand.	Methyl alcohol.	Oil, percent.	Per cent. of U. S. P. requirement.	Remarks.
C. W. Plummer, Lakeport.	None..	9.2	92.0	
G. W. Lord, Tilton.....	None..	7.6	76.0	Colored with coal-tar dye.
E. C. Atwood, Penacook...	None..	5.6	56.0	
D. Cardin, Nashua.....	None..	1.0	10.0	Colored with coal-tar dye. Mfd. by Wright Perfume Co., Boston.
P. Gahagan, Franklin.....	None..	1.2	12.0	Manufactured by Burlington Extract Co., Burlington, Vt.
Frank M. Eayrs, Nashua..	None..	2.6	26.0	Manufactured by F. B. Richards, South Lyndeborough, N. H.
Victor Lussier, Nashua....	None..	9.6	96.0	
C. A. Faulkner, Rochester	None..	8.0	80.0	
John B. Morin, Somersworth.	None..	5.0	50.0	
Depot Street Pharmacy, Concord.	None..	3.2	32.0	
H. S. Sanborn, Concord...	None..	9.0	90.0	
W. P. Underhill, Concord.	None..	1.8	18.0	
W. L. Reagan, Concord....	None..	9.0	90.0	

LINIMENTUM CAMPHORÆ.

The standard requires a 20 per cent. solution of camphor in cotton-seed oil. While all of the seven samples examined were found to have been prepared with the proper menstruum, but one of these contained the requisite amount of camphor, while two, both commercial products, were found to be seriously deficient in this respect, the worst sample showing but a little more than 3 per cent.

CAMPHORATED OIL BELOW STANDARD.

Dealer.	Camphor, per cent.	Per cent. U. S. P. strength.	Remarks.
F. A. Brown, Nashua	3.32	16.60	Manufactured by J. H. Folkins Company, Boston.
D. Cardin, Nashua	7.43	37.15	Manufactured by Falls & Burkinshaw, Lowell, Mass.
West Pearl Street Pharmacy, Nashua	18.98	94.90	
Victor Lussier, Nashua	17.77	88.85	
D. J. Hallisey, Nashua	18.84	94.20	
G. W. Shaw, Rochester	15.92	79.90	

LIQUOR CALCIS.

Sixteen samples were examined, five of which were found to be below standard. One of the latter was quite neutral and perfectly valueless for any purpose whatever.

LIME WATER BELOW STANDARD.

Dealer.	Per cent. of U. S. P. requirement.
E. C. Atwood, Penacook	92.1
A. E. Wallace, Nashua	62.0
Joseph F. Cassidy, Rochester	98.0
D. F. Giles & Co., Concord	73.0
I. S. Jackman, Franklin	0.0

SPIRITUS CAMPHORÆ.

Of the sixteen samples examined, nine were found to be below standard, the worst sample being a commercial preparation showing but 53 per cent. of required strength.

SPIRITS OF CAMPHOR FOUND BELOW STANDARD.

Dealer.	Methyl Alcohol.	Polarization, 100 mm.	Per cent. of U. S. P. requirement.
C. W. Plummer, Lakeport.	None	18.7	80
George A. Collins, Lakeport	None	20.5	88
J. H. Story, Laconia.	None	19.0	82
I. S. Jackman, Franklin	None	22.5	95
E. C. Atwood, Penacook	None	14.5	63
G. W. Shaw, Rochester	None	21.0	90
Enterprise Grocery Co., Rochester	None	12.0	53
C. A. Faulkner, Rochester	None	21.0	90
John B. Morin, Somersworth	None	18.5	80
E. B. Mann & Co., Woodsville	None	12.6	55
A. J. Precourt, Manchester	None	20.0	85

SPIRITUS FRUMENTI.

Four samples of whiskey, purchased of druggists for medicinal use, were received. The analysis indicates that all of these were compounds (known to the trade as "blends"), consisting largely of the cheap, artificial product mixed with some real whiskey. In view of the prices charged, fifty to seventy cents per pint, equivalent to $4 to $5 per gallon, it would seem that the purchaser might feel justified in expecting to receive genuine whiskey. These goods are sold to the purchaser as whiskey, and the latter of course has no means of knowing that the word "blend" may be stenciled upon the head of the cask in the dealer's cellar.

WHISKEY, NOT IN ACCORDANCE WITH THE U. S. PHARMACOPŒIA.

Dealer.	Price per pint, cents.	Alcohol, per cent.	Solids, per cent.	Artificial color, per cent.	Remarks.
Clarence W. Plummer, Laconia	50	45.10	0.64	50	Compounded.
Clarence W. Plummer, Laconia.	70	45.15	0.18	70	Compounded.
G. A. Quimby, Laconia	50	45.95	0.16	82	Compounded.
G. A. Quimby, Laconia	60	45.70	0.20	61	Compounded.

SULPHUR PRÆCIPITATUM.

A great improvement is noticeable in the character of this article as now sold. Whereas the U. S. P. requires that such shall contain not less than 99.5 per cent. of sulphur, the great bulk of this product as formerly sold contained from 40 to 60 per cent. of gypsum. The plea of old stock will not hold in this case, as any druggist worthy of the name should be able to distinguish by simple inspection between the pure article and the usual gypsum mixture.

PRECIPITATED SULPHUR FOUND ADULTERATED.

Dealer.	Purity, per cent.	Remarks.
D. F. Giles & Co., Concord.....	41.9	Nearly 60 per cent. gysum.
West Pearl Pharmacy, Nashua....	53.1	Nearly half gypsum.

TINCT. FERRI CHLORIDI.

Eight samples were received, four of which were found to be below standard, two of the latter being but slightly so. While the Pharmacopœia directs that metallic iron shall be used as the basis for making this preparation, there seems to be evidence that some druggists are following the much less troublesome procedure of making up directly from dry ferric chloride. The latter is so highly deliquescent that a proper degree of accuracy is impossible in this way.

TINCTURE MURIATE OF IRON FOUND BELOW STANDARD.

Dealer.	Methyl Alcohol.	Iron, per cent.	Per cent. of U. S. P. requirement.
C. W. Plummer, Lakeport.....	None.....	4.42	96.5
G. A. Collins, Lakeport.....	None.....	4.46	97.4
G. W. Lord, Tilton.....	None....	3.67	80.1
I. S. Jackman, Franklin.....	None..... ...	4.09	89.3

TINCTURA IODI.

Of the twenty-two samples examined, sixteen failed to conform to requirements. Of the latter, one was 95 per cent. of the required strength, seven showed 85 to 95 per cent., five, 75 to 85 per cent., while the iodine content of four ranged from 63 per cent. to 74 per cent. While these results show an improvement over those obtained on former inspections,

there still seems to be a notable failure on the part of the average druggist to prepare a standard article of this kind. Experience shows that there is no trouble in making this tincture of the U. S. P. strength, and under proper conditions such will keep indefinitely without any such loss of iodine as would be represented by the figures given.

Former inspections have shown that wood alcohol was not infrequently used by druggists in the making of this and certain other pharmaceuticals, but we have not recently met with any instance of this nature.

TINCTURE OF IODINE FOUND BELOW STANDARD.

Dealer.	Per cent. of U. S. P. requirement.
C. W. Plummer, Lakeport	72.8
G. A. Collins, Lakeport	84.9
G. W. Lord, Tilton	86.0
E. C. Atwood, Penacook	90.0
D. J. Hallisey, Nashua	95 0
R. D. Burnham, Rochester	82.0
Joseph Plante, Somersworth	80.0
Joseph F. Cassidy, Rochester	92.0
Depot Street Pharmacy, Concord	82.0
A. D. S. Pharmacy, Concord	63.0
W. P. Underhill, Concord	71.0
W. L. Reagan, Concord	82.0
E. B. Mann & Co., Woodsville	34.0
A. J. Precourt, Manchester	86.0
Joseph A. Parr, Manchester	90.0
La Blanc & Provencher, Manchester	72.4

EXAMINATIONS OF HAIR TONICS AND OTHER TOILET PREPARATIONS.

HAIR TONICS.

Fifteen hair tonics, or dandruff cures, are included in the list. Goods of this character as now appearing on the market, may be divided into the following classes: (1) Mixtures of sulphur and glycerin, with or without lead acetate—depending upon whether the preparation is to act as a dye as well as a tonic. The glycerin serves mainly as a vehicle for the sulphur, the latter acting as a germicide and also, in conjunction with lead, gradually forming black lead sulphide. It should be borne in mind that lead acetate, taken by the mouth, is a violent poison; applied externally it is more or less readily absorbed and may give rise to lead-poisoning. (2) Dilute alcoholic solutions, with or without glycerin or borax, containing essential oils and some form of rubefacient, or "counter-irritant." Most essential oils have an antiseptic action, rosemary and lavender especially being considered as of value in the treatment of disorders of the scalp. For the purpose of stimulating the circulation cantharides is commonly employed, though its place may be effectively taken by some other one of the large number of substances capable of producing an irritation of the skin. Where glycerin and boric acid are used these may be present in the form of boro-glycerin, a powerful though relatively harmless antiseptic. (3) A more expensive class combines the constituents of (2) with the alkaloids of cinchona and, rarely, of nux vomica; these alkaloids are supposed to act as "tonics" in increasing the growth of the hair, though it would seem probable that the chief value of the first in preparations of this nature is attributable to their antiseptic character.

All of these preparations were examined for harmful or objectionable constituents and to determine the general character; the analyses are not offered as complete. The following brands come under class 1:

No. 3368. *Hay's Hair Health.* Philo Hay Specialty Co., Newark, N. J.. "It is not a dye." "Is perfectly harmless." "Many have had every trace of grayness and baldness removed by using a single bottle." The first two claims are false, as is also the last part of the third, if intended to apply to permanent baldness. Contains lead acetate, glycerin and sulphur.

No. 2373. *Parker's Hair Balsam.* Hiscox & Co., New York. Contains lead acetate, sulphur and glycerin.

No. 3372. *Hall's Vegetable Sicilian Hair Renewer.* R. P. Hall & Co., Nashua. Sample contained in oval bottle and labeled as being guaranteed under the federal food and drug act. The analysis shows glycerin and sulphur. Tests for alcohol, heavy metals, skin irritants, borax, etc., resulted negatively. This sample does not appear to represent the old formula; neither is it the new, now advertised and put up in a different styled package, and said to include glycerin, boro-glycerin, capsicum, bay rum, sulphur, tea, rosemary, alcohol and perfume.

No. 3374. *Ayer's Hair Vigor.* J. C. Ayer & Co., Lowell, Mass. "New improved formula" claims sulphur, glycerin, quinine, sodium, chloride, cantharides, sage alcohol and perfume. All of these constituents were identified, and a test for wood alcohol resulted negatively. The package fails to bear a statement with regard to the per cent. of alcohol, as required under the federal act.

Under class 2:

No. 3363. *Coke's Dandruff Cure.* A. H. Bremer & Co., New York. The analysis shows cantharides, and 30.4 per cent. alcohol, practically all of which was found to be methyl, or wood alcohol. The total solids amount to 0.61 per cent. The presence of wood alcohol makes this a dangerous preparation, and its sale is therefore illegal.

No. 3342. *Zepp's Dandruff Cure.* T. Noonan & Co., Boston, Mass. Labeled as containing 46 per cent. of grain alcohol. The analysis shows 2 per cent. of solids, largely glycerin. Contains cantharides, a small amount of borax and 46.4 per cent. of ethyl alcohol.

No. 3366. *Corollas Hair Tonic.* H. W. Taylor & Co., New York. The claim that "no matter how long bald, or from whatever cause, Corollas will give you a fine head of hair," is not capable of substantiation. Also, the claim that this substance is "absolutely a vegetable compound" is erroneous, in view of the fact that the sample contained borax. Total solids, 0.73 per cent., alcohol, 19.7 per cent. Wood alcohol absent. Contains a vesicant, or skin-irritant, not identified.

No. 3367. *Westphal's Auxiliator.* Paul Wesphal, New York. Shows 3.56 per cent. of residue on evaporation, largely glycerin, with borax, or boric acid. No alkaloids or vesicants were detected. The analysis shows 54.8 per cent. of alcohol, of which 20 per cent. (*i. e.* 10.96 per cent.) was found to be methyl, or wood alcohol.

Under class 3, and miscellaneous:

No. 3364. *Seven Sutherland Sisters' Hair Grower.* Seven Sutherland Sisters, 18 Desbrosses St., New York. The wrapper bears the questionable statement that "if you are bald, S. S. S. Hair Grower will give you a fine head of hair." Shows 0.94 per cent. of residue on evaporation; 28.4 per cent. alcohol—all ethyl. Contains quinine and small amount of borax; no vesicating substance was detected.

No. 3365. *Mme. Yale's Excelsior Hair Tonic.* Mme. Yale, New York. Leaves 2.09 per cent. of residue on evaporation, largely glycerin with cinchona alkaloids. Gives a slight reaction for borox, or boric acid, but shows no vesicating substance. Contains 17.0 per cent. of alcohol—all ethyl.

No. 3369. *Danderine.* Knowlton Danderine Co., Chicago. "Danderine is the only specific known that will positively produce capillary attraction and natural effulgence"—a statement that presumably makes up in impressiveness what it lacks in comprehensibility to the average purchaser. Labeled as containing 10 per cent. of alcohol. Shows 4.55 per cent. of residue, largely glycerin and borax or boric acid. No wood alcohol. Contains a small amount of salicylic acid and a vesicating substance, not identified.

No. 3340. *Newbro's Herpicide.* Herpicide Co., Detroit, Mich. Leaves 2.5 per cent. of residue on evaporation, about one per cent. of which is salicylic acid, with some borax or boric acid. Shows no alkaloids or vesicants. Contains 56.2 per cent. of alcohol, practically all of which was found to be methyl, or wood alcohol. As a constituent of a dandruff cure, salicylic acid doubtless finds an appropriate place; the only objectionable ingredient in this preparation is the wood alcohol.

Under No. 3341, another sample of Herpicide was examined—such sample being said to represent fresh stock received since January 1, 1907. The alcohol in this sample, amounting to 52.6 per cent., was also found to be of the methyl variety. Moreover, the package contained no statement of the percentage of alcohol, as is required by law in the case of all such preparations. So long as this product contains wood alcohol it cannot be legally sold in New Hampshire.

No. 3347. *Foso Bark.* Altenheim Medical Dispensary, Cincinnati, Ohio. This is a whitish, turbid-looking liquid that leaves a residue on evaporation amounting to 0.46 per cent. The two most conspicuous constituents are oil of wintergreen and what corresponds to onion juice, the former doubtless serving the double purpose of a medicant and a cover for the odor of the latter constituent. An alkaloidal principle also contained in this preparation was unidentified. The sample showed a small amount of alcohol—all in the form of ethyl—and some borax or boric acid.

No. 3541. *Barry's Trycopherous or Medicated Compound.* A. C. Barry, 34 Stone St., New York. The analysis shows 82.5 per cent. of alcohol and 7.27 per cent. of residue on evaporation. The latter was found to consist very largely of a fixed oil. No alkaloids, metals, or vesicating agents were detected.

No. 3823. *Crani-Tonic Hair Food.* Crani-Tonic Hair Food Co., New York. Submitted from Keene. Labeled as containing 20 per cent. of alcohol. Alcohol found, 14.60 per cent. Total solid residue on evaporation 0.37 per cent. Contains no rubefacients (cantharides, capsicum, etc.) or alkaloids (quinine, strychnine, etc.). Contains a small amount of borax or boracic acid and a fraction of one per cent. of volatile oils. No methyl alcohol.

LOTIONS, COSMETICS, COLD CREAMS, ETC.

These may be divided into two classes, (1) including preparations intended for the removal of some facial disfigurement, or for the bleaching of the complexion, and (2) substances designed as soothing applications for minor or temporary disorders of the skin. While certain constituents of the second class, such as borax, benzoin, almond meal, etc., serve to some extent as bleachers, yet most of the patent preparations sold for this purpose and for the removal of tan, freckles, and the like, contain such drastic and objectionable substances as salts of mercury, lead and zinc.

The second class of preparations may be subdivided into (a) those containing oily or waxy substances (*e. g.*, lanolin, cerates) such as occur in so-called "skin foods," and (b) mixtures of essential oils and boroglycerin, or some other antiseptic, suspended or emulsified with some vegetable gum,—usually tragacanth.

A third class of preparations, designed and extensively sold for the removal of superfluous hair (depilatories), is based upon the use of caustic substanses such as quicklime, sulphide of potash, chloride of zinc and sulphide of arsenic.

No. 3370. *Mrs. McCorrison's Famous Diamond Lotion.* Prepared by Dr. E. K. Guenther, Waldboro, Me. Offered for the removal of tan, freckles and pimples and for continued use as a cosmetic. "Contains no oils, greasy substances or chemicals and cannot injure the most delicate or sensitive skin. Perfectly harmless." The analysis shows 1.59 per cent of solids, consisting mainly, if not wholly, of corrosive sublimate, no other substances being detected. That remedies made up of one of the most violent poisons should be so commonly sold as "perfectly harmless" with no hint whatever of their real character renders preparations of this class peculiarly dangerous actions to have about the house. Even sup-

posing the chance of accident eliminated, there is serious danger of injury through the external use of corrosive sublimate, ignorantly or carelessly applied. If the indiscriminate continued use of such a preparation does nothing worse in the end than "add the blush of a rose to the plainest face," its user may be considered fortunate.

No. 3380. *Soule's Eradicator.* L. M. Brock & Co., Lynn, Mass. "Warranted not to injure the skin." Similar to the preceding. The analysis shows 1.37 per cent. of solid residue, consisting of a mixture of corrosive sublimate and calomel.

No. 3377. *Champlin's Liquid Pearl.* Champlin Mfg. Co., New York. "Contains nothing injurious to the most delicate skin." The analysis shows 24.35 per cent. of solids, consisting of lead carbonate. Concerning the use of this substance the National Dispensary states that "it should never be applied where the cuticle is broken, as it is one of the most poisonous of the salts of lead."

No. 3417. *Dr. T. Felix Gouraud's Oriental Cream or Magical Beautifier.* Dr. T. Felix Gouraud, 37 Great Jones Street, New York. Said to be "so harmless we taste it to be sure it is properly made." The fact that this preparation is intended to sell for $1.50 affords a good example of the price the public is willing to pay for some simple, well-known article, so long as it is offered under a fanciful name and its identity kept secret. This "Magical Beautifier" was found to consist of approximately one-half ounce of calomel suspended in a short half pint of water—a liberal valuation of which would be about five cents. Calomel is an insoluble salt of mercury, and while not poisonous in the way that corrosive sublimate is, nevertheless, as a mercurial, it belongs to a drastic class of substances that ought not to be offered for general sale without proper labeling.

Included among toilet preparations of the other class are:

No. 3375. *Holmes' Fragrant Frostilla.* Clay W. Holmes, Elmira, N. Y. Shows 14.89 per cent. of residue on evaporation. The base is a vegetable gum, apparently tragacanth. Contains a small amount of glycerin and ethyl alcohol.

No. 3376. *Madame Zaza Toilet Cream.* J. M. Grosvenor & Co., Boston. Claims "the entire absence of oils, glycerin, fats and other greasy substances." This statement was found to be incorrect, to the extent that glycerin is present, though this may have been introduced in the form of boroglycerin. The analysis shows boric acid, volatile oils and a vegetable gum, apparently tragacanth. Methyl alcohol absent. Residue on evaporation, 8.07 per cent.

No. 3399. *Toiletine.* Toiletine Company, Montague, Mass. Leaves 7.06 per cent. of residue on evaporation. The analysis shows this prepa-

tion to consist of an emulsion of oil of wintergreen with a vegetable gum corresponding to tragacanth.

No. 3419. *Larkin's Derma Balm.* Larkin & Co., Buffalo, N. Y. Consists of a mucilage of vegetable gum—apparently tragacanth—with essential oils, borax or boric acid, and glycerin.

No. 3378. *Hinds' Honey and Almond Cream.* A. S. Hinds, Portland, Me. According to the label "this preparation contains no oil, grease or chemicals." "Contains 7 per cent. of Cologne Spirit." The analysis shows this product to contain a base of partially saponified beeswax, emulsified and flavored with bitter almond oil. No lanolin was detected. Contains 6.4 per cent. alcohol, 10.97 per cent. of solid residue, including some borax and glycerin. Does not leave a grease-spot on paper. The use of the word "honey" in designating this preparation is illegal, no honey being present.

No. 3438. *Daggett & Ramsdell's Cold Cream.* Daggett & Ramsdell, Yew York. This preparation is of an ointment-like consistency and contains a base of wax or cerate. No lanolin was detected. Contains borax or boric acid.

TOILET WATERS.

No. 3409. *Bay Rum, Double Distilled.* H. Michelson, St. Thomas, W. I. Contains 50 per cent. of alcohol. No wood alcohol.

No. 3410. *Savoi Bay Rum.* Savoi et Cie., Paris. Contains 12.80 per cent. of alcohol. No wood alcohol. A standard article of bay rum should show not far from 50 per cent. of alcohol, this amount being necessary in order to hold in solution the quantity of volatile oils that should be present.

No. 3413. *Florida Water.* Colgate & Co., New York. Contains 66.4 per cent. of alcohol. No wood alcohol.

No. 3414. *Florida Water.* Diaz & Co. Contains 13 per cent. of alcohol—all methyl, or wood alcohol.

No. 3414. *Florida Water.* Le Grand Perf. Works, New York and Paris. Contains no alcohol and no glycerin. Florida waters are prepared by dissolving a mixture of essential oils in moderately strong alcohol. Therefore, while there is no standard, the better grades will necessarily show a considerable percentage of alcohol.

No. 3416. *Violet Toilet Water.* Dupont et Cie., Paris. Total alcohol, 67.60 per cent. Contains 33.80 per cent. of wood alcohol.

EXTRACT OF WITCH HAZEL.

Properly speaking, extract of witch hazel, as prepared according to the U. S. P., contains a considerable amount of tannins and other extractives,

and is a very different article from that which is commonly sold as witch hazel extract. The latter consists of a dilute alcoholic liquid obtained by the distillation of the shoots and twigs of Hammamelis virginiana. The therapeutic reputation of this shrub seems to have originated with the American Indians, who made use, medicinally, of the highly astringent bark. Aqua hammamelis (prepared by distillation), while generally extolled as a sort of universal panacea, contains, in addition to the dilute alcohol, nothing more than traces of an essential oil, and as it seems to be drinkable without any apparent effect, it is very difficult to believe some of the claims made for the curative virtues of this article.

No. 3411. *Violet Witch Hazel, Regal Brand.* Wristley, Chicago. Contains 7.8 per cent. of alcohol. Wood alcohol and formaldehyde absent.

No. 3412. *Munyon's Extract of Witch Hazel.* Munyon Remedy Company, Philadelphia. Contains 11.6 per cent. of alcohol. Wood alcohol and formaldehyde absent.

No. 3418. *Pond's Extract.* Pond's Extract Company, New York. Contains 14.95 per cent. of alcohol. Residue on evaporation 0.01 per cent. Wood alcohol and formaldehyde absent. Notwithstanding the extreme (and it would appear, misleading) claims of the manufacturers, we are unable to find wherein this product differs (aside from alcoholic content) in any essential particular from other so-called "extracts" of witch hazel.

MISCELLANEOUS EXAMINATIONS.

RADOL—"A RADIUM-IMPREGNATED FLUID."

This is a colorless, odorless liquid, exploited as a cure (internally administered) for cancer and purporting to be prepared by D. Rupert Wells, M. D., St. Louis, Mo. The facts involved represent a typical illustration of the tendency of the average patient, suffering from some incurable or difficultly curable disease, to allow himself to be deluded and swindled by the advertising empiric after the efforts of the home physician have failed of results. To the great mass of the people who are in no position to appreciate the limitations involved, the arguments of Dr. Wells, as contained in his booklets and circulars, are very convincing. Their plausibility is in fact well calculated to appeal to even the most intelligent and well informed of sufferers.

That most people have heard something of the new and mysterious element, radium, and that a certain vague knowledge exists relative to the possible applicability of this substance in connection with the treatment of cancer are facts of which the St. Louis "philanthropist" has made excellent use to his own advantage. As in the case of the X-ray, so with radium, there are a few cases of cancer on record that would seem to have been benefitted by the direct and persistent application of the emanations to the tumor itself. This the doctor, however, claims to apply indirectly by making use of the well-known phenomenon of induced radio-activity, in that, by bringing his tube of radium salt in the presence of a vessel of water the latter becomes endowed with all the therapeutic properties of the element itself. Given a tube of radium salt, by this ingenious scheme he is apparently able to induce a "bluish fluorescent glow" ("imparted by the radium") in indefinite quantities of distilled water, and by the addition of "certain ingredients of harmless character," not only to charge the latter with "germ-destroying properties" but also to render it a "delightful and invigorating tonic."

That water thus "radiotised" could possess any possible virtue in the treatment of cancer is utterly out of the question. This fluid, which according to the statement of the person who brought the matter to our attention, costs five dollars a pint, was found to contain 6.96 per cent. of alcohol and approximately two grains to the ounce of quinine sulphate.

In these proportions it requires the aid of some imagination to detect the "bluish fluorescent glow," but whatever of this property the doctor may have observed may be safely chargeable to the quinine. Aside from the misrepresentation, the absence of any alcohol label on the package renders Doctor Wells liable under the federal laws.

REVELENTA ARABICA.

Prepared by Du Barry & Co., Tottenham Court Road, London. Represented as being a farinaceous preparation designed for the use of invalids and of especial value as a nutritive and specific in connection with the treatment of a great variety of illnesses and disorders. According to the instructions a meal is to be prepared by boiling about two tablespoonfuls for fifteen or twenty minutes with a pint of water.

This preparation was submitted for analysis with the request that it be examined for some deleterious constituent, as it seemed to have a pronouncedly objectionable effect on the patient using it, the symptoms described being a peculiar weakness and dizziness, which persisted as long as the food was used, but disappeared when the diet was changed.

In appearance this food is of a pale reddish-yellow color. A microscopical examination indicates it to consist essentially of lentil flour. The nitrogen content was found to be 3.88 per cent., corresponding to about 24 per cent. of protein.

The lentil (*Lens esculenta*) is a small reddish-yellow seed, of the same classification as the pea and bean. This food, historically interesting because of its ancient use and of its having formed the basis of Esau's mess of pottage, is consumed to a considerable extent in Mediterranean countries, where it is considered as being highly nutritious. However, there seems to be some evidence that this legume not infrequently proves difficult of digestion and apt to disorder the bowels, though such tendency is claimed to be less marked where, as in this case, the seed hulls have been removed.

POLLANTIN.

Prepared by Schimmel & Co., Miltitz, Germany. Represented as being "an anti-toxin serum prepared from the pollen of golden rod and ragweed," designed for the treatment of hay fever. The examination shows it to be a substance of an albuminous nature mixed with milk sugar. Contains no cocaine or opiates.

MATIS.

This "cure" for rheumatism, prepared by Chas. Carow Company, 194 Pulaski street, Brooklyn, N. Y., is represented as being "purely vegetable." The analysis shows 2.10 per cent. of saline matter, largely potassium iodide.

CAFFODYNE.

A headache preparation manufactured by Brewer & Co., Worcester, Mass. Sample forwarded from Hampton. Tablets consist of acetanilid, caffein and bicarbonate of soda.

A. D. S. HEADACHE WAFERS.

A ten cent package contains four wafers, each represented as carrying four grains of acetanilid. The analysis shows this to be correct, the other constituents being milk sugar and caffein. While the preparation differs in no essential from the numerous other preparations of this kind on the market, yet the accompanying reading matter is designed to lead the user to believe that the above is "perfectly safe," as, unlike the ordinary variety, it is alleged to "cure the head without injuring the heart." Manufactured by American Druggists' Syndicate Co., New York.

NATURE TISSUE TABLETS.

According to the statement upon the package, these tablets "supply the waste and degeneration of tissue and arrest the decay and failing of old age. These are a tissue food and not a medicine. They give strength and tone to the entire system and prevent disease. They are used in liver, stomach and kidney troubles, and should be taken where there is any breaking down of the tissues." Manufactured by the Toxo-Absorbent Company, Rochester, New York. The above represents one of the baldest kinds of false claims conceivable. These tablets are in no sense a food and they cannot possibly do the things claimed for them. The manufacturer gives a dissertation upon the value of "getting back to earth," and the conclusions that he draws as to the benefits of dirt-eating are skilfully calculated to redound to his advantage. To be sure, common earth is cheap enough but this will not serve because it is not pure, whereas the Toxo-Absorbent product is specially taken from the bowels of the earth, where all matter is necessarily in a sterile, uncontaminated condition.

The analysis shows about 50 per cent. of clayey earth mixed with about 15 per cent. of carbonate of magnesia, some charcoal, and an aromatic of the nature of a carminative.

OBESITY TABLET.

Dr. F. J. Kellog's Obesity-Reducing Tablets. "A safe fat reducer." Guaranteed under the Food and Drugs Act, by F. J. Kellog, Battle Creek, Michigan. This preparation seems to consist principally of cooked starch, apparently wheat. Examinations were made for arsenic and for other

substances of a deleterious nature, with negative results. It is difficult to understand how this preparation can possibly accomplish what is claimed for it.

DIOZO.

Prepared by the Parker Chemical Company, Chicago. Consists of a tin box with perforations and designed to hang up on the wall; sells for fifty cents. The apparatus is represented as "constantly throwing off minute crystals which ozonify and purify the air." This is a misstatement, so far as the ozonification is concerned,—although it does undoubtedly give forth infinitesimal traces of vapor sufficient to produce a distinct odor. Also represented as destroying "microbes and disease germs. Prevents spread of contagion, imparts a refreshing and healthful odor to the sick room, and is most beneficial in relieving colds, whooping cough, croup, asthma, bronchitis, catarrh, diphtheria, lung trouble."

These claims are too strong by far. The contents of the box consist of a half pound cone composed of a crystalline mass of crude naphthalene—one of the higher distillates from coal-tar containing beside naphthalene, small proportions of carbolic acid and allied bodies. While it is known that such products do tend to volatilize slightly on exposure to the air, nevertheless the claims made for this article are in general of a decidedly misleading character and druggists and others are therefore warned that the present labeling is in violation of the Food and Drugs Act.

STRAW'S ODOR-NO.

A liquid disinfectant prepared by the Odor-No Chemical Company, Boston, Mass. Sells for 50 cents per bottle. It is a colorless, nearly tasteless, non-corrosive liquid, exhibiting a very faint odor suggestive of perfume. Represented as a non-poisonous agent for the destruction of germs and odors, also to be used as a douche for the cure of sore throat and leucorrhoea, and as a spray for purifying the atmosphere of sick rooms, schools, churches, etc. The manufacturers submit a certificate from a bacteriologist testifying to the efficiency of this preparation as a germicide.

The analysis shows this product to consist of about one per cent. of boracic acid, less than one-half per cent. of formaldehyde and three per cent. of alcohol. While there is no doubt that such a preparation will do what is claimed for it, nevertheless the public should not be unwittingly beguiled into paying 50 cents for an article consisting of but a fraction of a cent's worth of the most common antiseptic agents, mingled with water.

MAPLEINE.

Crescent Manufacturing Company, Seattle, Wash. Consists of a thick brownish liquid, evidently representing a decoction of same plant, or plants; odor suggestive of walnuts.

Whether or not this is one of the products at one time the basis of the flavor of the so-called "Pure Vermont Maple Syrups," as manufactured in Boston and other cities, we have no information concerning. Some of the descriptive literature accidentally came into our hands and a sample of the product was secured. The literature seeks to call Mapleine to the attention of the housewife as a general flavoring material and for candies and the preparation of a substitute for maple syrup. While for the latter purpose it cannot be said to produce a very close imitation of the genuine, yet its flavor is agreeable, and as sold for the purposes represented it is a legitimate product.

FOODS POSING AS "CURES."

Millions of dollars have been made through patent medicines. Whether there really be or not, most people labor under the impression that there is something the matter with them. As a natural corollary, manufacturers have discovered the immense advantage accruing from causing their preparations to appear in the combination role of food and medicine.

GRAPE-NUTS AND POSTUM CEREAL.

One of the earliest and most familiar examples of this kind of advertising tactics is to be found in the preparations of the Postum Cereal Company, known respectively as "Grape-Nuts" and "Postum Cereal." As showing the ingenious application of the patent medicine idea to foods, let the purchaser of one of these preparations read the little booklet contained within the package, entitled "The Road to Wellville." This false character of the claims made for these products has been definitely shown by other laboratories and no detailed statement is necessary here. The most recent exposé was made by the Pennsylvania Dairy and Food Department, which has recently issued a bulletin on the subject of breakfast foods (Bul. 162, Department of Agriculture, Harrisburg, Pa.). As a result of this investigation, suits were entered in connection with the sale of a number of these products, including "Grape-Nuts," misbranding being the allegation. Eight of these suits were subsequently nol prossed on the manufacturers agreeing to change their labeling, but it is significant of the obstinancy of the Postum Cereal Company that this name fails to appear in the list.[1]

[1] Penna. Dairy and Food Bulletin, Feb. 15, 1908.

CRESCO FLOUR.

"Cresco" Flour is the new name of the product formerly sold by Farwell & Rhines, Watertown, N. Y., under the name of gluten flour. The manufacturers are very careful that the label on the present package shall contain no "false or misleading statement." However, the accompanying "specialty letter" is a marvel of ingenious sophistry. It is apparent that this firm is continuing to mislead the public in the claims made for the dietetic value of its product. Properly speaking, the latter is not a flour but a meal, as it is granular in consistency. So far as its starch and protein content is concerned, it does not differ materially from common bread flour, while the cost is approximately double. The manufacturers claim that Cresco Flour "is made from a small per cent. of the very best wheat obtainable, selected with special reference to the quality and component parts of the gluten and other elements it contains, carefully and skilfully extracted and combined by our own peculiar methods. It is made in such a way that the process of preparing it for use in bread, biscuits, gems, griddle cakes, etc., so acts upon the carbohydrates and other properties of the wheat kernel contained in it, as to render it a reliable and invaluable article of diet for sufferers from acid dyspepsia, indigestion, debility, obesity, kidney and liver troubles, including mild forms of diabetes. *This Cresco Flour can be depended upon to accomplish all results which have been claimed for our gluten flour* and which has made that product the standard of purity and sanatory value in its particular field, here and abroad for so many years."

Whatever the above may actually mean, it is certain that the average sufferer, if not the average physician, will infer that this food is designed for use in connection with diabetes or other similar maladies, and that it has been so treated that only "a small per cent." of the original wheat flour remains, whereas there is no evidence that it is anything else but a bran-free wheat product. Furthermore, there is no reason for believing that it will make "much more than ordinary flour" of bread and rolls, as is alleged.

The Farwell & Rhines Company complain that we have done them a serious injustice in reporting one of their products in the January *Bulletin* as a "gluten" flour. The facts are, however, that this product was purchased under the distinct belief that it was a gluten flour, it being labeled "Special Diabetic Food." The analysis showed but 12.88 per cent. protein. The name has since been changed to "Special Dietetic Food" (compare cuts), but the accompanying literature continues to deceive.

No. 1.

Trade-mark registered in U. S. Patent Office.

An invaluable flour for Diabetics, Palatable, reliable, and of rare nutritive value. Unrivaled anywhere.
FARWELL & RHINES'
SPECIAL
DIABETIC FOOD
Farwell & Rhines
FLOUR
WATERTOWN, N. Y.
Note also "Cresco Flour," for Dyspeptics, "K. C. Whole Wheat Flour," "Barley Crystals" "Cresco Grits," etc.

AS A BREAD, GEM AND BISCUIT FLOUR FOR DIABETICS IT DEFIES COMPETITION IN THIS COUNTRY OR EUROPE.

RETAIL PRICE OF SPECIAL DIABETIC FOOD AT MILL.

Per Barrel (180 lbs.)	$16 00	Per Quarter Barrel	$4 00
Per Half Barrel	8 00	Per Eighth Barrel	2 00

From "Specialty Letter" dated June, 1906: "Some Diabetics mix 'Cresco Flour' and 'Special Diabetic Food' together with good results." Also from circular of same date: "Repeated analyses of 'Special Diabetic Food' have invariably demonstrated its comparative freedom from the starchy and saccharin principles of ordinary flour." But analyses made at the Laboratory of Hygiene have indicated that this product does not differ essentially in starch and protein content from ordinary flour.

No. 2.

Trade-Mark Registered in U. S. Patent Office and abroad.

A valuable flour for Invalids, Palatable, Reliable and of much nutritive value. Unexcelled anywhere.
FARWELL & RHINES'
SPECIAL
DIETETIC FOOD
Farwell & Rhines
FLOUR
WATERTOWN, N. Y.
Note also "Cresco Flour," for Dyspeptics, "K.C. Whole Wheat Flour," "Barley Crystals, "Cresco Grits," etc.

AS A BREAD, GEM AND BISCUIT FLOUR FOR THE INVALID IT DEFIES COMPETITION IN THIS COUNTRY OR EUROPE.

RETAIL PRICES OF SPECIAL DIETETIC FOOD AT MILL.

Per Barrel (180 lbs)	$16.00	Per Quarter Barrel	$4.00
Per Half Barrel	6.00	Per Eighth Barrel	2.00

From "Specialty Letter" dated March, 1908: "Some Diabetics mix 'Cresco Flour' and 'Special Dietetic Food' together with good results."

The principal label has been changed and the more glaring misstatements skilfully modified so as to avoid technical falsehood. Nevertheless the claims are still plainly designed to delude both physician and patient, and moreover the proprietors are continuing to distribute with their goods the fraudulent circular of June, 1906, referred to under Cut No. 1.

CHOKOLATE COMPOUND.

Neal's "Instantaneous Vigor Chokolate Compound" (American Health Products Company, Syracuse, N. Y.), costs 90 cents for a half pound can and claims to combine as a beverage the virtues of malt, milk, chocolate, tea and coffee, with all of their disadvantages eliminated. The analysis follows:

Cane sugar	50.00 per cent.
Milk sugar	14.00 per cent.
Proteids	12.31 per cent.
Fat	5.36 per cent.
Caffein and theobromine	0.43 per cent.
Ash	4.52 per cent.

The evidence is that most, if not all, of the fat present consists of cocoa butter. The product therefore consists essentially of a mixture of one half ordinary cane sugar, together with cocoa and dessicated milk (partly or wholly skimmed). Nevertheless, the usual exaggerated claims are made,—as witness the statement of the circular: "My Vigor Chokolate strikes at the very root of lung troubles, kidney diseases, nervous prostration and other dangerous maladies, because it supplies nerve-force, power and vigor to the diseased organs." As a "health" product this is in the same class with the so-called tannin-less coffees, with the difference that whereas in the latter case the purchaser does get coffee, in this instance he gets principally sugar.

DYSPEPSIA BISCUIT.

Another preparation of the American Health Products Company, sold under the name of "Neal's Dyspepsia Biscuits," is represented as being prepared from "pine-apple, paw-paw melon, figs, oranges, celery, ginger, wheat in a specially prepared, easily assimilated form, and other vegetable products combined with proper blending agents so that it is acceptable to the most delicate stomachs." Recommended for use in connection with "dyspepsia, indigestion, heart-burn, torpid liver, biliousness, constipation, catarrh of the stomach and bowels, sick and nervous headaches. pimples, blotches and diseases of the skin, heart, blood and nervous system, produced by stomach troubles," also "anemia, loss of appetite, nervousness, nervous prostration and troubles arising from faulty metabolism."

Under the microscope these biscuits showed a considerable quantity of partially converted wheat starch and some ginger, while the taste indicates the presence of soda. A partial analysis showed:

Total starch by diastase	47.52 per cent.
Dextrin, ready formed	9.98 per cent.
Starch convertible by digestion at 55° C	7.92 per cent.
Sugars (invert)	6.56 per cent.

These biscuits are supposed to be eaten a short time before partaking of a regular meal. It seems probable that their principal virtue rests in the fact that the eating serves to stimulate the flow of digestive fluids, thereby preparing the stomach for the reception of food. It is true that the nibbling of a simple cracker a short time previous to the meal would exert a similar effect.

NUT PRODUCTS.

Christian's "Protoid Nuts," and Christian's "Combination Nut Butter," prepared by Eugene Christian, food scientist, New York, are to be placed in the list of "medicinal" or so-called "health" foods to the extent that their sale is accompanied by a quantity of literature specially designed to appeal to the invalid. It can, however, be said in their favor that the attached claims for dietetic value are much more reasonable than is the case with the majority of preparations of this class.

These nut products are intended more especially to supply a vegetable dietary of uncooked foods. "Protoid Nuts," said to represent the Italian *pignolia*, so prepared as to be edibly attractive, is a palatable product sold under a guaranty of 35 per cent. proteids and 45 per cent. of fat, which the analysis substantiates. The label of the package submitted bore the claim that "three teaspoonfuls of Protoid Nuts equal in food value half pound of beef." This objectionable statement is said to be omitted from the stock now being supplied.

ANALYSIS OF AN ABNORMAL MAPLE SYRUP.

The laboratory is not infrequently requested to make examinations of maple syrups alleged to be adulterated for the reason that a crystalline deposit of sugar has appeared at the bottom of the container. In most cases the request for the analysis is accompanied, not by the syrup, but by a portion of the separated sugar. It should be understood that as a basis for judging the quality of the syrup, a sample of this kind is worthless. This is evident when it is considered that the sugar of the maple tree is the same as that of sugar cane, the valuable constituents being certain "impurities" peculiar to maple sap that serve to impart the flavor. Therefore when maple syrup crystallizes, the deposited sugar is simply a fairly pure "rock candy" mixed with a small proportion of "nitre," the larger proportion of the impurities having remained dissolved.

The standard weight for maple syrup is eleven pounds to the gallon. This, however, is about as high a degree of concentration as a syrup will stand without crystallizing, and in practice it will be found that the aver-

age gallon weighs slightly less than eleven pounds—a fraction of a pound at this point causing a surprisingly great difference in the apparent "heaviness."

Complaint of adulteration was made in the case of the syrup whose analysis follows. This sample was very heavy, the viscosity approaching that of glucose. The flavor was poor, being somewhat suggestive of molasses.

Flavor,	rather poor
Aroma, hot,	normal
Specific gravity,	1.394
Weight per gallon,	11.63 pounds
Total ash,	0.748 per cent.
Soluble ash,	4.480
Insoluble ash,	0.268
Alkalinity of soluble ash,	5.2 cc
Alkalinity of insoluble ash	6.3 cc
Per cent. of ash soluble,	64.1
Reducing sugars,	9.98 per cent.
Polarization (a),	63.25
(b),	-21.90
Sucrose,	64.26
Hortvet number,	2.35
Malic acid value,	0.83

The above data conclusively indicate the genuineness of the product and its freedom from adulteration by such articles as cane sugar, glucose, molasses, or brown sugar. It is apparent that this syrup was somewhat over-concentrated, as well as over-heated in the making, with the result that the character of a portion of the sugars was changed, aud the flavor of the product thus impaired.

METHODS OF ANALYSIS EMPLOYED IN THE EXAMINATION OF ICE CREAM AND OF CERTAIN FLAVORING EXTRACTS.

The following papers on the analysis of ice cream and of flavoring extracts, published in the Journal of the American Chemical Society, represent methods that were recently devised by the chemist in connection with the routine examination of the above substances in this laboratory.

[1]THE ANALYSIS OF ICE CREAM.

With the recent enactment of standards for ice cream by several of the states, the analysis of this substance is just beginning to receive attention on the part of food inspection chemists. As the literature seems to contain no specific methods, the following (in part simple modifications of general methods) are offered as having been in successful use at this laboratory.

Fat.—It is especially desirable to make this estimation as soon as possible after the sample has melted, as it not infrequently occurs that on short standing, even before appreciable souring has taken place, the butter-fat tends to separate in such a manner, and on mixing, returns to the surface so rapidly as to render the removal of a representative portion exceedingly difficult, while if care is not exercised in attempts at emulsifying, butter-clots are apt to be formed.

Except for purposes of approximation, or unless the sample is very largely diluted, the use of the plain Babcock method is not admissible. Leach's copper sulphide method for the estimation of fat in condensed milk is not directly applicable, because of the fact that in this case the fat is not carried down by the precipitated proteids, but persists in rising to the surface, and no other precipitant seems capable of affording any different result.

The procedure finally adopted consists of a modification of Leach's method, involving a solution of the fat in chloroform, with the subsequent removal of the latter in a current of steam. Using a blunt-pointed pipette, eighteen grams of the sample are weighed into a Babcock cream bottle, preferably of the Bartlett, or bulb type; graduated to 25 per cent. in fifths. Add 3 cc. chloroform and water to about three fourths the capacity of the bottle. Agitate, add about 10 cc. of Fehling's copper sulphate solution, mix and centrifuge for three minutes, when all of the fat will be found in the underlying chloroform layer. In the presence of appreciable quantities of gum tragacanth or gelatin, the supernatent liquid will persist in remaining turbid; this difficulty may be obviated by the addition of two or three cc. of N/10 alkali, the resulting copper hydroxide serving to precipitate the gum very perfectly. Insert a glass tube of small bore, connect with an aspirator and remove most of the supernatent liquid. Repeat the washing once, then introduce a tube of small bore connected with a source of steam provided with a safety cock, and blow in live steam for two or three minutes, or until the chloroform

[1][Reprinted from the Journal of the American Chemical Society, Vol. XXIX, No. 11, November, 1907.]

has been completely expelled; the latter condition is essential. The use of a water bath for the removal of the chloroform is not feasible, as the precipitated proteids retain the latter with great persistency, and its removal is not complete even after prolonged heating in this manner. Cool the contents of the bottle, add water to a volume of 17.5 cc., and proceed as usual, being careful to secure complete solution in the acid of the somewhat hardened proteid substance.

A second method for fat, recommended by the Chicago Board of Health,[1] has been given only a brief trial in this laboratory. This method has the advantage of rapidity, and is said by those who have used it extensively to give good results. It would seem, however, that some little skill is required in its execution to avoid contamination of the fat column by casein on the one hand, and charring on the other. The procedure is as follows: "Run 9 g. of ice cream into the test bottle. Add 30 cc. of a mixture of equal parts by volume of conc. HCl and 80 per cent. acetic acid. Heat on a water-bath till well darkened, but short of charring. Whirl in a Babcock centrifuge and read the percentage of fat directly. If the cream is charred, ether may be added after whirling. The layer containing the fat is drawn off into another bottle and the ether evaporated. The bottle is then filled with water and again whirled and the fat read directly."

Character of the Fatty Matter.—While the practice is apparently not a common one, there seems to be evidence that in certain sections at least, not a little "ice cream" is put upon the market, the fat of which consists in part or wholly of oleo or cotton-seed oil. For purposes of examination the fatty matter may be advantageously separated by removing 30-40 cc. of the cream layer to a fat-bottle, adding one cc. of strong mercuric nitrate solution and 20 cc. of petroleum ether and whirling in a centrifuge. The ethereal layer is removed, washed with water and the ether evaporated.

Chemical Preservatives.—The presence of borax may be detected by removing five cc. of the separated serum to a porcelain dish, rendering distinctly acid with ten per cent. hydrochloric acid, adding five drops of turmeric tincture and evaporating. For formaldehyde the hydrochloric acid test may be used as a preliminary, but as ice cream free from this body affords by this treatment a purplish brown color, the distillation method should be employed to confirm any positive indication noted. Saccharin and other bodies of this class are detected in connection with the test for gelatin.

[1] Rep. State Food Commissioner, Illinois, 1906, 80.

Fillers and "Mechanical Preservatives."—The old-fashioned recipes for cheap ice cream call for corn-starch or eggs, the first being quickly detectable and the second indicated by the deep yellow color imparted by the yolks to the underlying serum separating from the sample on standing. At present there is a large number of patent, or secret preparations on the market, most of which consist essentially of gelatin or gum tragacanth. The writer has recently had his attention directed to two such, sold to manufacturers of ice cream under the names of "foamiline" and "cream-puff."

The use of compounds of this description is not altogether for the purpose of taking the place of butter-fat, since manufacturers of high grade cream allege that their addition in small quantity is necessary, in the case of goods intended to be shipped or to be kept over much more than twenty-four hours, for the purpose of causing the ice cream to "stand up," that is, retain its homogeneity and obviate the tendency to marginal icing that occurs with storage. It appears that manufacturers are thus able to "hold over" goods under refrigeration for several days or even indefinite periods, in order to await favorable weather or market conditions.

Another substance that is being used to some extent as a filler of ice cream is commercial casein. Such use in New Hampshire has been observed in several instances—the solidified, cheesy appearance of the caseinous stratum separating from the sample, affording an indication that was later confirmed outside the laboratory. Obviously, a method for detecting this class of goods might be based upon the determination of the increased albuminoid content.

For the detection of gelatin the method of Stokes may be followed, using 20–15 cc. of the mixed sample. Any faint cloudiness corresponding to less than 0.10 per cent. of gelatin is ignored. The main portion of the filtrate from the proteids is then extracted with chloroform and examined for saccharin and similar substances in the usual manner.

Where any considerable quantity of gum tragacanth or a similar substance has been used, such fact is determinable without difficulty. The writer has observed samples of melted ice cream that were fairly stiff from the presence of excessive amounts of gum. However, in those cases where the latter is used for its mechanical effect the quantity may be less than 0.5 per cent., or even as little as 0.25 per cent. In view of the remarkable similarity in the general behavior to reagents of casein and the vegetable gums, and the tendency of the latter to be carried down with the former under the influence of metallic precipitants, the development of a method for the detection of such a small quantity of this class of substances offers more difficulty than might be supposed.

The conversion of the gummy material into mucic acid might be used as a test, but it is of course necessary to first remove all lactose, and the subsequent procedure not only consumes some time, but the results are apt to be rather uncertain, especially in the presence of but 0.2–0.3 per cent. of gum. Reichl and Breinl's orcinol test (Allen, "Commercial Organic Analysis," Volume I, page 422) would seem to be valuable in this connection, as it affords a striking reaction as applied to the alcohol-washed mixture of gum casein; unfortunately, however, casein alone appears to give a similar reaction.

A preliminary test that serves well consists in precipitating 10 cc. of the separated serum with acetone, washing with two or three portions of dilute alcohol (using a centrifuge). The washed residue is boiled with 6–8 cc. of water, and 1 cc. sodium hydroxide (1–10) for about thirty seconds. This treatment results in the formation of albuminates largely soluble in hot alcohol. The gum is converted into pectates soluble in water, but insoluble in hot alcohol, while any gelatin is decomposed into bodies not precipitable by alcohol. The liquid is cooled and allowed to stand a few minutes to facilitate the separation of any insoluble caseinous matter; filtered, filtrate heated to boiling, one and one-half volumes of warm alcohol added and mixed. In the presence of 0.2 per cent. of gum tragacanth or agar-agar, a characteristic flocculent precipitate will *immediately* separate. Any turbidity, or slight precipitation on standing a few moments, should be ignored. The precipitated pectate may be dissolved in cold water and the solution saturated with ammonium sulphate for the purpose of demonstrating the absence of any appreciable quantity of proteids.

A second procedure, involving more or less complete preliminary removal of proteids and bases, with conversion of the gum into pectic acids, consists in boiling 10 cc. of the separated serum to 5 cc. after addition of one half cc. of concentrated hydrochloric acid. Two volumes of alcohol are then added to the hot liquid and the resulting precipitate washed two or three times with alcohol. The residue is boiled with 5 cc. of water and one drop of strong acetic acid and filtered hot. The resulting filtrate is rendered just neutral or very faintly alkaline, boiled and filtered. Finally 1 cc. of sodium hydroxide (1–10) is added to the filtrate, the latter boiled for a few seconds, followed by the addition of one and one-half volumes of alcohol, noting any precipitation of alkaline pectate.

THE PRECIPITATION METHOD FOR THE ESTIMATION OF OILS IN FLAVORING EXTRACTS AND PHARMACEUTICAL PREPARATIONS.[1]

The polariscopic method for the estimation of essential oils in commercial extracts is of but limited application, the oils of lemon and orange being the only ones that can be accurately determined in this manner. For the estimation of such oils as peppermint, clove, wintergreen, and many others, two procedures are open: (*a*) the application of methods for the estimation of the most important constituents of these oils, such as menthol, eugenol, or methyl salicylate, and (*b*) the method by precipitation as suggested by Mitchell[2] and now adopted with modifications as official by the A. O. A. C.

In most instances the first procedure, as applied to extracts, is obviously capable of affording but little better than a general idea as regards strength or quality, while results by the second process involve the application of a large and variable correction. Thus, in the case of lemon oil Mitchell[3] found that results near to the truth were obtainable only in the presence of a relatively large proportion of oil—a 6 per cent. extract, for instance, showing 4.80 per cent. recoverable, while a 2.50 per cent. extract afforded by this procedure less than one half of the oil actually present.

With a less proportion of oil the error becomes still greater, and when we consider in addition that this error apparently varies not only with the quantity of oil, but with the kind, it is evident that for the examination of many of the miscellaneous extracts and essences now on the market—many of them containing as they do but one or two per cent. of oil—the method as at present carried out is of but very limited value. This fact will be appreciated by any who has attempted to examine some of the cheaper grades of peppermint essence.

By the modified method here proposed the writer has obtained most excellent results. The procedure has the advantage that no correction whatever for oil retained in solution is necessary, and moreover, with the single exception of almond extract, it affords equally accurate results in the case of alcoholic solutions of almost any one of the large class of essential oils. The advantages of simplicity and rapidity of execution may also be claimed, it being possible to carry through a series of several determinations in ten minutes.

Procedure.—To 10 cc. of the extract, pipetted into an ordinary Babcock

[1] Reprinted from the Journal of the American Chemical Society. Vol. XXX, No. 4. April 1, 1908.

[2] THIS JOURNAL, 21, 1132 (1899).

[3] *Loc. cit.*

milk bottle, are added in the following order, 25 cc. of cold water, 1 cc. hydrochloric acid of 1.2 specific gravity and 0.5 cc. chloroform. The mouth of the bottle is then closed by the thumb and vigorously shaken for not less than one minute. By this means all of the oil is dissolved by the chloroform, while the latter, in saturating the water, apparently serves to displace any appreciable trace of oil otherwise retainable by the alcohol-water mixture. The bottle is now whirled in the centrifuge for one and one half to two minutes and the resulting clear supernatant liquid is removed to within 3 or 4 cc. by the insertion of a glass tube of small bore connected with an aspirator. To the residue 1 cc. of ether is added and the contents of the bottle well agitated. Holding the latter at a slight angle it is plunged to the neck in a boiling waterbath, and, giving a gentle rotary motion, is maintained at this temperature for exactly one minute. This step is best carried out by removing one of the small rings from a water- or steam bath and holding the bottle in the live steam. The ether serves the purpose of steadily and rapidly sweeping out every trace of chloroform—a result that would be otherwise attainable only with considerable difficulty and loss of oil. The latter by this procedure has been found to be inappreciable. Finally the bottle is cooled and filled with water at room temperature so as to bring the oil into the graduated stem of the bottle, and after centrifuging for one-half minute the reading is taken to the highest point of the meniscus; the reading multiplied by 2 gives the per cent. of oil.

If it be desired, a special milk bottle with stem of smaller bore, or a skim milk bottle provided with a straight introductory tube may be employed. It has been found, however, that with the ordinary Babcock bottle there is no difficulty in securing check results to one-tenth per cent.

Modification for the Heavier Oils.—In the case of oil of wintergreen it was found to be impossible to secure a compact readable column of the oil by means of salt solution. This procedure also proved to be not satisfactorily applicable for almond extract. For the estimation of these oils use was at first made of a specially devised form of the so-called Hortvet tube, in which the bore of the stem is so reduced that the graduated portion contains 2 cc. instead of 5 cc., the subdivisions having therefore the same values as in the case of the Babcock bottle. Using this form of tube, in the case of almond extract the most satisfactory results were obtained by employing double the quantities of chloroform and ether specified. Working in this manner it was found possible to recover practically 100 per cent. of the oil from a 1 per cent.

extract, but with stronger extracts 80 to 90 per cent. only proved recoverable.

In most cases, however, the use of the ordinary Babcock bottle with a suitable heavy liquid will be found to be preferable. For this purpose, except with the oils of cinnamon and cassia, the use of salt solution is out of the question. Trials were made of the applicability of diluted sulphuric acid, diluted glycerol and of sugar solution. The two latter were found to serve well for the lighter oils, but with wintergreen a gravity of not less than 1.2 is requisite and this involves a too high degree of viscosity. On the other hand, diluted sulphuric acid (1–2) was found to answer admirably. While it might be objected that the acid would tend to decompose some of the oils—notably those of clove and cinnamon—and thus afford low results, yet it was found that if agitation is avoided and the temperature of the acid mixture does not exceed 25°, no readable error is involved.

As a result of a large number of trials of this method, it was found that (except in the case of almond extract) not only could practically the theoretical amount of oil be recovered from 1, 3, 5 and 10 per cent. strengths of alcoholic solutions, but that also in the case of lemon and orange extracts results thus obtained very generally agreed to one tenth per cent. with those obtained polarimetrically, if the factor designated by Mitchell and Leach (3.4) was used.

It is well recognized that results by the polarimetric method of examining lemon and orange extracts are not to be implicitly relied upon as indicating in all cases the true proportion of oil present. The use of small quantities of cane sugar in the preparation of these extracts is apparently somewhat more common than has been generally supposed. Without doubt, so-called "washed" or "distilled" oil is being used to some extent in the making of extracts, and furthermore the addition of high polarizing orange terpenes for the purpose of increasing the rotary power is a perfectly practicable form of adulteration.

The precipitation method, therefore—aside from merely providing material for a refractometric examination—affords a direct and valuable check on the polarimetric results. For instance, if the results by precipitation are materially lower than those obtained polarimetrically, there is ground for the suspicion that other than a "straight" oil has been used; if on the contrary, they are higher and the oil is present in moderately large quantity, such would be proof-positive either of adulteration with a foreign oil, or else of the use of an oil that had undergone marked deterioration, while if the polarimetric reading was but slight, or zero,

any precipitated oil might be assumed to represent citral or one of the other lemon oil substitutes.

The results presented below were obtained on solutions of definite strength prepared with 90 per cent. alcohol. Results obtained with commercial extracts are also substituted.

Extract.	Strength, per cent.	Oil recovered, per cent.
Lemon	5.0	5.0
"	1.0	1.0
Peppermint	1.0	1.0
"	3.0	3.0
"	5.0	5.0
Clove	1.0	1.0
"	10.0	10.2
Cassia	1.0	1.0
Wintergreen	1.0	1.1
"	2.0	2.0
"	5.0	5.1
Bitter almonds	1.0	1.0
" "	3.0	2.5
Citral (pure, optically inactive)	3.0	3.0
"	0.5	0.5

COMMERCIAL EXTRACTS.

Variety.	Oil by precipitation.	Oil by polarization.
Lemon	4.8	4.80
"	4.6	4.63
"	4.0	4.10
"	5.0	5.00
"	4.40	4.50
"	4.8	4.70
Peppermint	3.8	....
"	5.6	....
"	12.4	....
Cinnamon	3.0	....
Checkerberry	4.0	....
"	12.5	....
Rose	0.6	....

CONCERNING A DECOMPOSITION OF CLAMS AND ITS EFFECT ON THEIR EDIBILITY.

BY C. D. HOWARD, CHEMIST.

Purchasers of clams find two varieties upon the New England markets. The so-called "soft" or "long" clam, *mya arenaria*, represents the ordinary marine beach variety of the New England coast, and on the Boston market this is the variety to which the word "clam" is apt to refer. Another species, found from Cape Cod southward, and obtained by dredging the bottoms of bays and inlets through five to twenty feet of water, is the *venus mercenaria*, ordinarily known as the "quahog," or "hard" clam. The smaller sizes of the latter constitute the highly-esteemed "little necks." Most of our canned clams are designated as being of the latter variety, though perhaps not truthfully in all cases.

Another class of mollusks, in many respects resembling the clam, and by the average American apt to be referred to under this title, is represented by the mussel, of which the edible variety, *mytilus edulis*, is partaken of to a considerable extent by Europeans. Both this and the fresh water variety occur clinging to wharves and rocks along shore, where they are permanently anchored by their "muscles."

It has long been recognized that the partaking of either clams or mussels is not infrequently a cause of illness. By many this is ascribed to a special susceptibility, or idiosyncrasy in the individual. The theory has also been held that this feature is really due to a particular tendency of shellfish to decompose, with the formation of poisonous ptomaines. Another interesting earlier theory, soon exploded, ascribed the poisoning as being due to copper ingested by the mussels from the ships' bottoms to which they clung.

That illness from partaking of mussels is in reality chiefly apt to be due to a poisonous ptomaine, has been definitely demonstrated, and such ptomaine, mytilotoxine, has been isolated and studied. But that this toxin is not due merely to putrefactive agencies in the normal dead body has been proven by Brieger,[1] who was repeatedly unable to isolate mytilo-

[1] "Ptomaines and Leucomaines," Vaughan & Novy.

toxine from the putrefying bodies of mussels taken from non-polluted waters, although he readily obtained it from the same variety found in a certain bay. It was further demonstrated that poisonous mussels placed in clean waters ultimately became non-poisonous and *vice versa*. The logical conclusion, therefore, is that illness resulting from partaking of clams, mussels, oysters and other shellfish is usually to be ascribed to the fact that their environment not infrequently causes them to be "foul feeders," and that under such circumstances they ingest a great variety of the lower organisms thriving in filthy or polluted waters.

During December, 1906, two cans of clams, representing two different brands, were forwarded for examination, the claim being that such articles were in a partial state of decomposition and that persons who had partaken of this brand had been rendered ill. The examination afforded the following data:

No. 3258. Odor and taste normal; color of liquid pale olive; color of stomach contents greenish. Solder ring around under side of cap in top, also inner edge of top, quite black. Inner wall of can somewhat discolored. Discoloration found to be due to a film of iron sulphide overlying one of iron oxide. On warming contents of can, traces of sulphuretted hydrogen were evolved. No preservatives were detected.

No. 3259. Odor and taste normal; contents yellowish in color. No black rings but inner wall of can notably darkened. Contents evolved traces of sulphuretted hydrogen on warming. No preservatives detected.

Subsequently eleven other samples of canned clams, including all the leading brands, were examined. All were found to be in an apparently wholesome condition and free from preservatives. The cans all, however, showed blackening or discoloration in some degree, from very slight to exceedingly marked.

In order to gain an idea as regards the tendency of fresh clams to evolve sulphuretted hydrogen, some fresh live clams were minced and one hundred grams of the mixture of meat and juice were placed in bottles (a) untreated, (b) mixed with one per cent. of borax, (c) mixed with one-half per cent. of salicylic acid. These bottles were closed, connected with tubes containing (1) lead acetate solution, (2) alcoholic mercuric chloride solution, and a slow current of hydrogen aspirated through at room temperature.

After twenty-four hours none of the lead acetate tubes showed any darkening; after thirty-six hours (a) showed slight darkening, none in (b) or (c). After sixty-four hours (a) showed a considerable precipitate of lead sulphide, a very slight one in (b) and no trace in (c). The experiment was continued for seven days, at the end of which time considerable

precipitates of black lead sulphide had collected in tubes from bottles (a) and (b), but tube (c) continued to show no trace of any darkening. The mercuric chloride tubes on bottles (a) and (b) showed slight crystalline sediments and exhibited a very acrid, penetrating, garlic-like odor; the contents of bottles (a) and (b) also showed the same odor, while (c) showed but little of this character. It is therefore evident that fresh clams begin to evolve sulphuretted hydrogen about twenty-four hours after opening, and that under such conditions as the above there is also generated certain ethereal sulphides of somewhat similar character to those of mustard oil.

According to a leading packer of canned goods, the present method of canning clams consists in sterilizing them, after having been placed in cans, by exposing to the temperature of 212 degrees for four hours, after which the cans are sealed. In some cases superheated steam is used, thus reducing the time required to a minimum of one hour.

To ascertain the effect of this method of sterilization on the subsequent evolution of sulphuretted hydrogen, fresh live clams were minced and the mixture heated to the boiling point, when it was found that traces of sulphuretted hydrogen began to come off almost at once. This evolution was found to continue indefinitely, being pronounced even at the end of five hours' maintenance at the boiling point.

In the case of oysters (several samples), the interesting observation was made that no sulphuretted hydrogen is evolved as a result of such heating.

According to Norton[1] the discoloration of metallic containers by sulphur compounds may be due to two causes, (a) from sulphurous acid used as a preservative and reduced to sulphuretted hydrogen by the tin in presence of a fruit acid, and (b) decomposition of proteids as a result of the "heavy" process of canning, now commonly employed in the case of peas, corn and other vegetables. In the case of clams, it is probable that discoloration is also attributable to the existence of some easily decomposable proteid-like constituent. The remedy for this discoloration would seem to be in using well-coated cans, and avoiding corrosion during the sealing process.

Influence of decomposition on food value. In order to obtain an idea as to the possible deleterious effect of partaking of clams the containers of which are blackened, the following experiments were carried out with guinea pigs; the observations were made by Doctor Duncan, pathologist:

1. Five cc. of freshly filtered clam-juice was introduced subcutaneously into pig No. 1. No abnormal conditions resulted.

[1] Journal American Chemical Society, 28, 1503.

2. The same juice was allowed to stand at room temperature for thirty-six hours, at which point the evolution of sulphuretted hydrogen commenced. Pig No. 2, inoculated with five cc. of this juice, gave no evidence of resulting illness.

3. Five cc. of the same juice seventy-two hours old and highly putrid, was introduced into pig No. 1. No apparent effect.

4. The next day pig No. 1 was inoculated with five cc. of juice taken from a freshly opened can (showing slight discoloration). No ill effects observed for forty-eight hours; pig afterwards became sick and died about seventy-two hours after the inoculation. The autopsy showed much œdema of the muscular tissue underlying the skin andideath was evidently due, not to toxæmia but to infection of the wound at the point of inoculation, probably from the putrescent material given previously.

5. Five cc. of the juice first mentioned, now ninety-six hours old and very highly putrescent, was introduced into pig No. 8. No ill effects noted up to forty-eight hours; the next morning the pig was found in very feeble condition and shortly died, the cause indicated by the autopsy being the same as in the case of pig No. 1.

6. The clam juice, now one week old, was thoroughly sterilized and five cc. of the vilely-smelling material injected into pig No. 2, every precaution being observed to avoid infection of the wound. Apparently no deleterious effect whatever was induced, thus proving the absence in any quantity of poisonous toxins in this highly decomposed material.

These results would seem to suggest that the ptomaines formed during the decomposition of clams grown under proper conditions are at least no more poisonous than are those resulting from the decomposition of other forms of animal life. And in view of the especial proneness of clams to evolve sulphuretted hydrogen, it appears quite evident that, provided taste, odor and general appearance are normal, any discoloration or blackening of the container is no ground for apprehension concerning the wholesomeness of the contents.

Note on a greenish color in oysters and clams. Samples of oysters have been forwarded to the laboratory from time to time accompanied by the complaint that they were greenish in appearance and presumably unfit for food. This green tint was found to be distributed over certain portions of the skin of the oyster through tiny capillaries; so far as could be observed, there was no other indication suggestive of decomposition.

The matter of this greenish color, at times noticeable in both clams and oysters, was made the subject of an investigation by Nelson, of the New Jersey Experiment Station, some years ago, whereby it was proved that such was due, not, as was variously assumed, to copper, or paris green,

or cholera germs, but to "the presence of a species of microscopically small vegetable organisms which the dryness of the past summer allowed to multiply in the water on the beds, and which the clams had eaten in large quantities, so that their tissues had become stained by the color of their food. The dye is perfectly harmless."

It is claimed that oysters so colored are in special demand in certain sections of Europe, the color being regarded as evidence of careful cultivation.

EXAMINATION OF ALCOHOLIC LIQUORS.

Dr. Irving A. Watson, Secretary State Board of Health.

DEAR SIR: I desire to submit to you a report of the examination of alcoholic liquors, conducted at the State Laboratory of Hygiene during the period of one year and eleven months ending August 31, 1908. This work has been done under authority of Chapter 35, Laws of 1908, entitled "An Act to Regulate the Traffic in Intoxicating Liquors," and which provides for the collection of samples of liquors from licensed vendors for examination at this laboratory.

These samples were collected by agents of the State License Commission, to which body I have submitted analytical reports from time to time. The total number of samples examined is 301, including 244 whiskies, 15 rums, 32 gins, 2 brandies, 6 wines and 2 of beer.

As in the past, we have met with no instances of distilled liquors containing any foreign deleterious substance; nor of any instance where the sample proved to be adulterated with any substances more potent than such articles as burnt sugar, beading oil, and plain water. In fact, there are but two questions worth considering in connection with the quality of a liquor,—at least so far as it concerns the analyst: (1) Does the sample represent a genuine, properly-matured product; or is it composed, either wholly or in part, of the imitation article? (2) Are the goods up to the required proof?

Of the 244 samples of whiskey submitted, but 24,—less than 10 per cent. could be classed as straight. The others were (1) what the rectifiers and bottlers choose to designate as "blends" but which are properly compounds, *i. e.*, mixtures of straight whiskey with artificial, and (2) products that the rectifiers refer to as "compound whiskey" but which are not logically entitled to such naming for the reason that a compound whiskey must contain some genuine whiskey, whereas this second class of products is wholly artificial.

Oleomargarine is a cheap and palatable substitute for butter, and so long as it is sold and served for exactly what it is no objection can be raised to its use. The situation as regards genuine and imitation whiskey is practically identical with this; yet up to the present we have witnessed but the meager beginning of any attempt to compel the sale of the latter

PLATE I.

EXAMPLES OF MISBRANDED WHISKIES.

The above may contain a little "Fine Old Rye," but the bulk consists of artificially colored and flavored neutral spirits.

on its merits. There seems very good reason for believing that not less than 95 per cent., and possibly more, of the liquor sold in New Hampshire by the glass in response to the call for whiskey, is of the compound or artificial variety.

The purchaser of bottled goods is apt to be not much better off, as the bottlers of compound whiskey apparently consider that they have license to emblazon upon their labels such laudatory designations as "Pure Old Kentucky Bourbon"; "Fine Old Maryland Rye Whiskey," so long as they insert in some inconspicuous corner the little word "blend"; and we sometimes find it added, indistinctly and even upside down, by means of a rubber stamp. But it is safe to assume that to the purchaser the word "blend" implies a mixture of two or more genuine whiskies (just as the rectifiers have designed that it should); and that this is the meaning also contemplated by the framers of the Federal Act has been held not only by the Federal Board of Food and Drug Inspection and by the United States Attorney-General, but this contention has already been upheld in some recent court decisions.

In view of what has been said it should be evident that the submission of samples representing bulk goods, *i. e.*, as drawn by the inspector from the cask, can have but limited value. While the agent's statement upon the paster affixed to the sample shows that not a few of the latter were supplied to the inspector as "blends," yet it is not conceivable that the seller would in the average case be apt to apprise the retail purchaser of the character of the liquor.

But a few original package samples (less than 20 per cent.) have thus far been submitted. If we are to consider the labeling in these cases as representative of conditions in New Hampshire, then it is evident that we have no more flagrant instances of misbranding covered by the Food and Drugs Law than is afforded by the bottlers of distilled liquors. This is a matter requiring action by the state, as the federal authorities have no jurisdiction.

Reference may be made to the character of the flasks in use in the New Hampshire liquor trade. As indicated by the containers in which inspectors' samples have been submitted, the three principal classes of these flasks are marked (1) "Registered Full Pint"; (2) "Guaranteed Full Pint"; and (3) "Warranted Flask." I have measured quite a number of each class. In all cases I have found the "Registered Full Pint" to contain not less than 16 ounces. The "Guaranteed Full Pint" I have yet to find containing 16 ounces, the actual capacity of those examined ranging from 14 to 15½ ounces. The "Warranted Flask" purports to be regular pint size and is sold as such, but I have not yet encountered one

containing over 13 ounces. Flasks of the first and second classes, when dispensed full of liquor, are plainly subject to the requirements of Section 4, third and fourth, of the Food and Drugs Law. The third class seems to be covered by Section 4, second, line 1.

In this connection attention should be called to the fact that under Section 4 of the law of 1907, the sale, either at wholesale or retal, of any imitation product in unlabeled packages is illegal. *That is, each and every flask filled from a barrel of compound or imitation liquor must be so labeled by the dealer as to indicate the character of the goods sold.*

At a meeting of the Association of State and National Food and Dairy Departments, held August 7, 1908, and composed of food officials representing the several states, as well as the federal government, the following standards for fermented and distilled liquors were adopted. These standards were submitted by the Joint Food Standards Committee—a committee whose membership has been selected from both the State and National Food and Dairy Department Association and the Association of Official Agricultural Chemists. Such standards have been under consideration for several years, and in view of the character of the authority represented it is probable that they will be adopted by most of the states at an early date.

STANDARDS FOR SPIRITUOUS LIQUORS.

1. *Distilled Spirit* is the distillate obtained from a fermented mash of cereals, molasses, sugars, fruits or other fermentable substance, and contains all the volatile flavors, essential oils and other substances derived directly from the material used, and the higher alcohols, ethers, acids and other volatile bodies congeneric with ethyl alcohol produced during fermentation, which are carried over at the ordinary temperature of distillation and the principal part of which is higher alcohols estimated as amylic.

2. *Alcohol, Cologne Spirit, Neutral Spirit, Velvet Spirit, or Silent Spirit,* is distilled spirit from which all, or practically all, of its constituents except ethyl alcohol and water are separated, and contains not less than 94.9 per per cent. (189.8 proof) by volume of ethyl alcohol.

3. *New Whiskey* is the properly distilled spirit from the properly prepared and properly fermented mash of malted grain, or of grain the starch of which has been hydrolyzed by malt; it has an alcoholic strength corresponding to the excise laws of the various countries in which it is produced, and contains in 100 liters of proof spirit not less than 100 grams of the various substances other than ethyl alcohol derived from the grain from which it is made, and of those produced during fermentation, the

PLATE II.

EXAMPLES OF MISBRANDED WHISKIES.

One of the above is sometimes found rubber-stamped "Blend," but this bottler evidently considers the information thus conveyed not worth the trouble.

PLATE III.

Paul Jones
★★★★
Whiskey.
All blend. Guaranteed under the pure foods Act of Congress, approved June 30, 1906.
To the Dealer: You are hereby guaranteed as provided by the pure foods Act of Congress June 30 1906 that the original contents of the pack age are not adulterated or misbrand ed within the meaning of said Act.
To further protect you the Secre tary of Agriculture at Washington holds our general guaranty serial No. 66.
Paul Jones & Co
Louisville Ky

EXAMPLES OF COMPOUND WHISKIES LABELED AS "BLENDS"

The rectifiers choose to consider the above a sufficient legal designation of the character of these goods. Not infrequently the inconspicuous addition of the little word, "blend" is made to serve as license for, and in extenuation of the boldest misstatements upon the face of the label.

principal part of which contains all the higher alcohols estimated as amylic.

4. *Whiskey (potable whiskey)* is new whiskey which has been stored in wood not less than four years without any artificial heat save that which may be imparted by warming the storehouse to the usual temperature, and contains in 100 liters of proof spirit not less than 200 grams of the substances found in new whiskey save as they are changed or eliminated by storage and of those produced as secondary bodies during aging; and, in addition thereto, the substances extracted from the casks in which it has been stored. It contains, when prepared for consumption as permitted by the regulations of the Bureau of Internal Revenue, not less than 45 per cent. by volume of ethyl alcohol, and, if no statement is made concerning its alcoholic strength, it contains not less than 50 per cent. of ethyl alcohol by volume, as prescribed by law.

5. *Rye Whiskey* is whiskey in the manufacture of which rye, either in a malted condition or with sufficient barley or rye malt to hydrolyze the starch, is the only grain used.

6. *Bourbon Whiskey* is a whiskey made in Kentucky from a mash of Indian corn and rye, and barley malt, of which Indian corn forms more than 50 per cent.

7. *Corn Whiskey* is whiskey made from malted Indian corn, or of Indian corn the starch of which has been hydrolyzed by barley malt.

8. *Blended Whiskey* is a mixture of two or more whiskeys.

9. *Scotch Whiskey* is whiskey made in Scotland solely from barley malt, in the drying of which peat has been used. It contains in 100 liters of proof spirit not less than 150 grams of the various substances prescribed for whiskey exclusive of those extracted from the cask.

10. *Irish Whiskey* is whiskey made in Ireland, and conforms in the proportions of its various ingredients to Scotch whiskey, save that it may be made of the same materials as prescribed for whiskey, and the malt used is not dried over peat.

11. *New Rum* is properly distilled spirit made from the properly fermented clean, sound juice of the sugar cane, the clean, sound massecuite made therefrom, clean, sound molasses from the massecuite, or any sound, clean intermediate product save sugar, and contains in 100 liters of proof spirit not less than 100 grams of the volatile flavors, oils and other substances derived from the materials from which it is made, and of the substances generic with the ethyl alcohol produced during fermentation,

which are carried over at the ordinary temperatures of distillation, the principal part of which is higher alcohols estimated as amylic.

12. *Rum (potable rum)* is a new rum stored not less than four years in wood without any artificial heat save that which may be imparted by warming the storehouse to the usual temperature and contains in 100 liters of proof spirit not less than 175 grams of the substances found in new rum save as they are changed or eliminated by storage, and of those produced as secondary bodies during aging; and, in addition thereto, the substances extracted from the casks. It contains, when prepared for consumption as permitted by the regulations of the Buresu of Internal Revenue, not less than 45 per cent. by volume of ethyl alcohol, and, if no statement is made concerning its alcoholic strength, it contains not less than 50 per cent. by volume of ethyl alcohol as prescribed by law.

13. *New Brandy* is a properly distilled spirit made from wine and contains in 100 liters of proof spirit not less than 100 grams of the volatile flavors, oils and other substances derived from the material from which it is made, and of the substances congeneric with ethyl alcohol produced during fermentation and carried over at the ordinary temperatures of distillation, the principal part of which consists of the higher alcohols estimated as amylic.

14. *Brandy (potable brandy)* is new brandy stored in wood for not less than four years without any artificial heat save that which may be imparted by warming the storehouse to the usual temperature, and contains in 100 liters of proof spirit not less than 150 grams of the substances found in new brandy save as they are changed or eliminated by storage, and of those produced as secondary bodies during aging; and, in addition thereto, the substances extracted from the casks in which it has been stored. It contains, when prepared for consumption as permitted by the Bureau of Internal Revenue, not less than 45 per cent. by volume of ethyl alcohol, and, if no statement is made concerning its alcoholic strength, it contains not less than 50 per cent. by volume of ethyl alcohol as prescribed by law.

15. *Cognac, Cognac Brandy*, is brandy produced in the departments of the Charente and Charente Inferieure, France, from wine produced in those departments.

MALT LIQUORS.

1. *Malt Liquor* is a beverage made by the alcoholic fermentation of an infusion, in potable water, of barley malt and hops, with or without unmalted grains, decorticated and degerminated grains.

2. *Beer* is a malt liquor produced by bottom fermentation, and contains, in one hundred (100) cubic centimeters, at 20 degrees C., not less than five (5) grams of extractive matter and sixteen one-hundredths (0.16) gram of ash, chiefly potassium phosphate, and not less than two and twenty-five hundredths (2.25) grams of alcohol.

3. *Lager Beer, Stored Beer*, is beer which has been stored in casks for at least three months, and contains in one hundred (100) cubic centimeters, at 20 degrees C., not less than five (5) grams of extractive matters, and sixteen one-hundredths (0.16) gram of ash, chiefly potassium phosphate, and not less than two and fifty-one hundredths (2.50) grams of alcohol.

4. *Malted Beer* is beer made of an infusion, in potable water, of barley, malt and hops, and contains, in one hundred (100) cubic centimeters, at 20 degrees C., not less than five (5) grams of extractive matter, nor less than two-tenths (0.2) gram of ash, chiefly potassium phosphate, nor less than two and twenty-five hundredths (2.25) grams of alcohol, nor less than four-tenths (0.4) gram of crude protein (nitrogen x 6.25).

5. *Ale* is a malt liquor produced by top fermentation, and contains, in one hundred (100) cubic centimeters, at 20 degrees C., not less than two and seventy-five hundredths (2.75) grams of alcohol, nor less than five (5) grams of extract, and not less than sixteen one-hundredths (0.16) gram of ash, chiefly potassium phosphate.

6. *Porter and Stout* are varieties of malt liquors made in part from highly roasted malt.

RESULTS OF ANALYSES OF DISTILLED LIQUORS.

Number.	Brand.	Collected of	Alcohol, per cent.	Solids, per cent.	Character.
753	Spring Side Old Fashioned High Grade Rye Whiskey	E. J. Sheridan, Berlin	42.10	.62	Misbranded; is largely artificial.
754	Bourbon Whiskey	Joseph A. Garand, Berlin	47.20	.52	Compounded.
755	Whiskey	Eugene Bean & Co., Berlin	42.45	.19	Largely artificial.
756	Canoe Club Whiskey	Albert Croteau, Berlin	45.72	.13	Compounded.
757	Davis' Rye Whiskey	Henry G. Smith, Berlin	45.66	.92	Compounded.
758	Hampshire Rye Whiskey	Alex Bouchard, Berlin	44.40	.20	Mainly artificial.
759	Old Monogram Whiskey	Toussant & Guay, Berlin	42.26	.59	
760	Tucker Rye Whiskey	Ed. D. McGioney, Berlin	42.30	.35	Largely artificial.
761	Old Charter Whiskey	Louis Berube, Berlin	44.40	.69	Compounded.
762	Old Miller Whiskey	Patrick J. Martin, Berlin	41.28	.28	Alcohol low.
763	Hunter Rye Whiskey	Bernhard Wolf, Manchester	46.15	.14	Compounded.
764	Capital City Whiskey	Chas. M. Hecker, Manchester	38.05	14	Largely artificial; alcohol low.
765	Whiskey	Weber & Grossman, Manchester.	38.15	14	Largely artificial; alcohol low.
766	Manhattan Whiskey	C. M. Hecker, Manchester	44.75	13	Largely artificial.
767	Finch's Golden Wedding Whiskey	Bernhard Wolf, Manchester	59.01	15	
768	Baker Whiskey	H. Rodelsperger	46.10	.57	
769	G. O. Blake Whiskey	M. T. Connor, Manchester	42.10	.68	Compounded.
771	Whiskey	Conrad Fiege, Manchester	38.30	.19	Compounded; alcohol low.
772	Whiskey	Bernhard Hecker, Manchester	51.72	.18	

773	Gibson's Whiskey	Conrad Fiege, Manchester	45.90	.31	Compounded.
774	Gibson's Whiskey	Bernhard Wolf, Manchester	46.35	.15	
775	Maple Brook Whiskey	M. T. Connor, Manchester	36.10	.25	Artificial; alcohol low.
776	Gibson's Whiskey	Chas. M. Hecker, Manchester	46.55	.14	
778	Whiskey	C. L. Wolf, Manchester	41.10	.23	Largely artificial; alcohol low.
779	Manhattan Whiskey	Weber & Grossman, Manchester.	44.00	.15	Largely artificial.
780	Atherton Whiskey	M. T. Connor, Manchester	39.65	.66	Compounded; alcohol low.
781	Methusalum Whiskey	H. Rodelsperger, Manchester.	43.55	.56	
782	Whiskey	Robert Schneider, Manchester	46.50	.08	Mainly artificial.
783	Baker's Rye Whiskey	Weber & Grossman, Manchester.	44.30	.33	Compounded.
784	Van Dyke Whiskey	Emil Kuehuel, Manchester	44.75	.12	Mainly artificial.
785	Van Dyke Whiskey.	Emil Kuehuel, Manchester	35.10	.16	Mainly artificial; alcohol very low.
786	Manhattan Whiskey	C. L. Wolf, Manchester	43.25	.39	Compounded.
787	Belle of Kentucky Whiskey	H. Rodelsperger, Manchester.	42.40	.14	Largely artificial; alcohol low.
788	Manhattan Whiskey	Conrad Fiege, Manchester	44.75	.40	Mainly artificial.
789	Manhattan Whiskey	Bernhard Hecker, Manchester	44.20	.15	Largely artificial.
790	Baker Whiskey.	Bernhard Hecker, Manchester	44.80	.35	Compounded.
793	Rum	Jos. Dugre, Manchester	52.96	.24	
794	Whiskey	Levasseur Bros., Manchester	49.70	.15	
795	Gin	T. F. Clancy, Manchester	38.80	.02	Alcohol low.
796	Gin	G. F. McCarty, Manchester	44.65	.03	
798	Whiskey	D. A. Teehan, Manchester	46.20	.19	Compounded.
799	Maryland Whiskey	G. F. McCarty, Manchester	39.05	.32	Compounded; alcohol low.
800	Whiskey	J. H. Connolly, Manchester.	40.75	.96	Compounded; alcohol low.
801	Gin	C. P. Connor & Co., Manchester	46.00	.01	

RESULTS OF ANALYSES OF DISTILLED LIQUORS.—*Continued.*

Number.	Brand.	Collected of	Alcohol, per cent.	Solids, per cent.	Character.
802	Brandy	J. H. Connoly, Manchester	45.90	.44	
803	Whiskey	Joseph Dugre, Manchester	47.85	.80	Compounded.
804	Gin	Pichette & Champoux, Manchester	42.45	.009	
805	Mayfair Whiskey	C. P. Connor & Co., Manchester	44.45	.87	Compounded.
806	Whiskey	Levasseur Bros., Manchester	50.21	.16	
807	Whiskey	J. T. Gillis & Co., Manchester	41.69	.28	Compounded; alcohol low.
808	Whiskey	J. T. Gillis & Co., Manchester.	44.45	.13	Compounded.
809	Thompson Whiskey	J. A. Ballou, Manchester	45.80	.33	Compounded.
810	Whiskey	D. A. Teehan, Manchester	45.90	.17	Compounded.
811	Gin	J. H. Connoly, Manchester	43.80	.85	Sweetened.
812	Valley Whiskey	Pichette & Champoux, Manchester	25.95	.10	Heavily watered; peculiar odor.
813	Whiskey	Geo. F. McCarty, Manchester	43.90	.29	Compounded.
814	G. O. Blake Whiskey	John A. Connolly, Manchester	41.10	.85	Compounded.
815	Gin	Joseph Dugre, Manchester	50.26	.02	
816	Whiskey	Thomas F. Clancy, Manchester	43.80	.35	Compounded.
817	Gin	Levasseur Bros., Manchester	44.90	.07	
818	Whiskey	Joseph Dugre, Manchester	43.80	1.00	Compounded.
819	Cavanaugh's Whiskey	Pichette & Champoux, Manchester	42.85	.47	Compounded.
820	Whiskey	Thomas F. Clancy, Manchester	44.50	.39	Compounded.

821	Whiskey	C. P. Connor & Co., Manchester	44.80	.17	Compounded.
822	Gin	M. Connor, Manchester	46.80	.26	
823	Rum	Levasseur Bros., Manchester	43.50	.13	
824	Whiskey	J. T. Gillies & Co., Manchester	36.15	.17	Mainly artificial; alcohol low.
825	Whiskey	D. A. Teehan, Manchester	45.10	.17	Compounded.
826	Whiskey	Pichette & Champoux, Manchester	45.20	.43	Compounded.
827	Whiskey	M. Connor, Manchester	44.55	.19	Compounded.
829	Walsh's Whiskey	John A. Ballou, Manchester	46.65	.77	Compounded.
830	Whiskey	Levasseur Bros., Manchester	18.50	.09	Heavily watered; artificial.
831	Whiskey	Patrick Lynch, Claremont	34.85	.24	Compounded; alcohol very low.
832	Whiskey	Paul H. Newell, Claremont	42.70	.24	Mainly artificial.
833	Whiskey	Atwood & Fagan, Claremont	45.00	.61	Mainly artificial.
834	Whiskey	Michael H. Brady, Claremont	41.40	.58	Compounded; alcohol low.
835	Whiskey	Frank Thompson, Claremont	44.55	.50	Compounded.
836	Whiskey	Charles D. Thing, Bristol	43.50	.40	Compounded.
837	Whiskey	George H. Fowler, Bristol	43.80	.62	Compounded.
838	Oakdale Whiskey	Patrick T. McManus, Dover	35.45	.14	Mainly artificial; alcohol low.
839	Whiskey	Francois Morin, Somersworth	39.45	.18	Largely artificial; alcohol low.
840	Westerly Rye Whiskey	McKernan & O'Neil, Dover	34.60	.19	Compounded; alcohol very low.
841	Whiskey	James Conley, Dover	40.05	.18	Mainly artificial; alcohol low.
842	Whiskey	Michael J. Leary, Somersworth	35.25	.20	Compounded; alcohol low.
846	Whiskey	Harry R. Twombley, Dover	39.90	.29	Artificial; alcohol low.
847	Old Dearborn Whiskey	Edward Sheehy, Dover	44.40	.32	Compounded.
848	Whiskey	Blake & Merrill, Farmington	44.75	.17	Compounded.
849	Eureka Whiskey	John Walsh, Farmington	46.15	.38	Compounded.
850	Whiskey	James W. Locke, Farmington	48.00	.34	Compounded.

RESULTS OF ANALYSES OF DISTILLED LIQUORS.—*Continued.*

Number.	Brand.	Collected of	Alcohol, per cent.	Solids, per cent.	Character.
851	Whiskey	Louis Gagne, Somersworth	37.05	.15	Compounded; alcohol low.
852	Whiskey	J. P. B. Roberts, Farmington	39.70	.72	Compounded; alcohol low.
853	Whiskey	Jos. Routhier, Somersworth	39.25	.17	Artificial; alcohol low.
854	Oakwood Whiskey	Napoleon Boutier, Dover	40.05	.26	Artificial; alcohol low.
855	Whiskey	Thomas Gray, Hillsborough	43.90	.77	Compounded.
856	Whiskey	Nat. Head, Hillsborough	44.25	.13	Compounded.
857	Whiskey	J. K. Locke, Hillsborough	41.90	.35	Compounded.
858	Gin	C. S. Perry & Co., Hillsborough	50.67	.01	
859	Whiskey	C. S. Perry & Co., Hillsborough	44.30	1.49	Heavily sweetened; compounded.
860	Whiskey	O. F. Sumner, Goffstown	44.30	.62	Compounded.
861	Whiskey	F. A. Greer, New Boston	44.15	.42	Compounded.
862	Whiskey	W. P. Averill, New Boston	42.15	.31	Compounded.
863	Whiskey	Edgard Lavallee, Pembroke	44 95	.25	Compounded.
864	Whiskey	J. H. Rainville, Pembroke	45.05	.36	Compounded.
865	Whiskey	John Ahern, Pembroke	42.70	.89	Compounded.
866	Whiskey	William J. Welch, Pembroke	44.00	.19	Compounded.
867	Whiskey	Rainville & Diamond, Pembroke	45.75	.36	Compounded.
868	Whiskey	J. S. Sausture, Pembroke	43.65	.41	Compounded.
869	Whiskey	James Gilbert, Pembroke	43.65	.54	Compounded.

870	Whiskey	Welch & Sullivan, Pembroke	45.10	.24	Mainly imitation.
871	Whiskey	James Brogan & Co., Ashland	39.70	.18	Mainly imitation; alcohol low.
872	Whiskey	H. D. Cilley & Co., Ashland	44.15	.65	Compounded.
873	Horseshoe Whiskey	Harry M. Bullard, Portsmouth	45.25	.11	Imitation.
874	Horseshoe Whiskey	Harry M. Bullard, Portsmouth	45.30	.11	Largely imitation.
875	Bon-Ton Whiskey	H. D. Cilley & Co., Ashland	40.15	.20	Compounded; alcohol low.
876	Whiskey	James Brogan & Co., Ashland	34.00	.18	Mainly imitation; alcohol very low.
877	Whiskey	Edmond Cross & Co., Ashland	40.60	.89	Compounded; alcohol low.
878	Whiskey	Edmond Cross & Co., Ashland	34.80	.76	Compounded; alcohol very low.
879	Susquehanna Rye Whiskey	Isaacher Giberson, Groveton	46.55	.12	Compounded.
880	Parker Rye Whiskey	Isaacher Giberson, Groveton	46.30	.44	
881	Oakland Whiskey	Xavier Turcotte, Groveton	38.10	.28	Compounded; alcohol low.
882	Old Marlow Whiskey	Charles E. Bellows, Groveton	40.25	.15	Compounded.
883	Wisdom Club Whiskey	Xavier Turcotte, Groveton	46.00	.13	Compounded.
884	Whiskey	Charles E. Bellows, Groveton	41.30	.16	Compounded; alcohol low.
885	Whiskey	Luis Arel, Hooksett	40.20	.22	Mainly imitation.
886	Whiskey	Willie Arel, Hooksett	41.55	.99	Compounded; alcohol low.
887	Whiskey	Arel & Richer, Hooksett	43.65	.40	Compounded.
888	Atherton Whiskey	B. W. Hodgkins, Keene	45.45	.17	
889	Old Sutton Whiskey	B. W. Hodgkins, Keene	44.90	.30	About 75 per cent. artificial.
890	Gin	B. W. Hodgkins, Keene	45.10	.01	
891	Whiskey	B. W. Hodgkins, Keene	37.00	.62	About 80 per cent. artificial; alcohol low.
892	Rum	B. W. Hodgkins, Keene	50.00	.32	
893	Gin	B. W. Hodgkins, Keene	49.45	.04	
894	Gin	C. L. Hitchcock, Keene	45.10	.44	Sweetened.
895	Rum	C. L. Hitchcock, Keene	47.00	1.40	Sweetened.

RESULTS OF ANALYSES OF DISTILLED LIQUORS.—*Continued.*

Number.	Brand.	Collected of	Alcohol, per cent.	Solids, per cent.	Character.
896	Lexington Rye Whiskey	G. L. Hitchcock, Keene	45.10	.17	Not straight whiskey.
897	Peach Blossoms Whiskey	G. L. Hitchcock, Keene	45.00	.39	About 75 per cent. artificial.
898	Dempsey Rye Whiskey	G. L. Hitchcock, Keene	44.75	.20	About 40 per cent. artificial.
899	Brandy	G. L. Hitchcock, Keene	47.10	1.25	Sweetened.
901	Gin	Ben O. Aldrich, Keene	49.10	.34	Sweetened.
902	Rum	Ben O. Aldrich, Keene	46.15	.14	
903	Paul Jones Whiskey	Ben O. Aldrich, Keene	44.60	.32	Not straight whiskey.
904	Chase Whiskey	C. G. Shedd, Keene	47.20	.17	
905	Pyramid Whiskey	C. G. Shedd, Keene	43.60	1.44	Heavily sweetened; about 50 per cent. artificial.
906	Gin	C. G. Shedd, Keene	44.95	.02	
908*	O. P. S. Whiskey	C. G. Shedd, Keene	39.80	.24	Misbranded; alcohol low.
909	Sunnyside Whiskey	C. G. Shedd, Keene	44.70	.29	About 75 per cent. artificial.
910	Whiskey	E. M. Flint, Keene	46.05	.18	Not straight whiskey.
911	Crimson Bell Whiskey	E. M. Flint, Keene	46.80	.76	Largely artificial.
912	Gin	E. M. Flint, Keene	46.40	.04	
913	Whiskey	E. M. Flint, Keene	46.00	.20	Contains some artificial.
914†	Paul Jones Whiskey	E. M. Flint, Keene	46.70	.17	Contains some artificial.
915	Rum	E. M. Flint, Keene	44.50	.18	
916	Whiskey	George Grovelle, Nashua	46.55	.14	Compounded.

917	Gin	Leblanc & Levesque, Nashua	51.88	.06	
918	Gin	George Grovelle, Jr., Nashua	50.26	.02	
919	Gin	Bauchemin & Dionne, Nashua	49.05	.004	
920	Whiskey	Andre Belanger, Nashua	45.25	.13	Compounded.
921	Gin	Joseph Labine, Nashua	48.30	.02	
922	Gin	P. H. Charpentier, Nashua	49.20	.008	
923	Gin	Andre Belanger, Nashua	51.22	.022	
924	Gin	Boggis & Cote, Nashua	56.94	.019	
925	Whiskey	Boggis & Cote, Nashua	39.10	.15	Alcohol low; about 50 per cent. artificial.
926	Whiskey	Alfred La Forme, Nashua	39.90	.14	Alcohol low; about 50 per cent. artificial.
927	Gin	Alfred La Forme, Nashua	40.05	.016	Alcohol low.
928‡	Whiskey	Lavoe & Gagne, Nashua	45.20	.13	Compounded; misbranded.
929	Whiskey	Le Blanc & Levesque, Nashua	44.40	1.17	Compounded; heavily sweetened.
930	Whiskey	P. H. Charpentier, Nashua	45.65	.15	
931	Whiskey	Joseph Labine, Nashua	44.00	.67	
932	Gin	Lavoe & Gagne, Nashua	49.40	.016	
933	Whiskey	Bauchemin & Dionne, Nashua	46.85	.15	Compounded.
934	Whiskey	Osias Charron, Nashua	45.15	.15	Compounded.
935	Gin	Osias Charron, Nashua	49.00	.017	
936	Gin	John H. Gannon, Kingston,	34.05	.21	Alcohol very low.
937	Whiskey	John M. Gannon, Kingston	45.65	.16	Compounded.
938	Whiskey	Maxine Shattry, Newfields	43.70	.41	Compounded.
939	Whiskey	Patrick Haley, Newmarket	42.60	.17	About 50 per cent. artificial.
940	Whiskey	Chase's Hotel, Newmarket	40.40	.26	About 50 per cent. artificial; alcohol low.

* No. 908, "This brand of whiskey is guaranteed to the consumers as pure hand-made sour mash whiskey." This is misbranding as the sample is very largely artificial.
† No. 914, "Paul Jones Whiskey," "a blend," "guaranteed under the Food and Drugs Act, June 30, 1906."
‡ No. 928, labeled "Highland Extra Copper Distilled Rye Whiskey"; no mention of "blend."

RESULTS OF ANALYSES OF DISTILLED LIQUORS.—*Continued.*

Number.	Brand.	Collected of	Alcohol, per cent.	Solids, per cent.	Character.
941	Whiskey	Francis Matteau, Newmarket	45.90	.12	About 50 per cent. artificial.
942	Whiskey	J. B. LaForte, Newmarket	46.20	.30	Compounded.
943	Whiskey	Alex. Roberge, Newmarket	44.90	.40	40 per cent. artificial.
944	Whiskey	G. H. Willey, Newmarket	41.10	.12	About 50 per cent. artificial; alcohol low.
945	Whiskey	C. A. Fowler, Newmarket	43.00	.40	Compounded.
946	Gin	Hewett & Large, Newton	42.45	.008	Alcohol low.
947	Gin	C. A. Fowler, Newton	44.20	.011	
948	Whiskey	Hewett & Large, Newton	43.80	.61	Compounded.
949	Whiskey	C. H. Mathes, Newmarket	44.60	.88	Compounded.
950	Whiskey	J. H. Broderick, Newmarket	40.40	.28	Largely artificial; alcohol low.
951	Whiskey	William E. Ritchie, Newmarket	38.10	8.64	Alcohol low and very heavily sweetened; at least 50 per cent. artificial.
952	Whiskey	James A. Filion, Newmarket	44.60	.52	About 40 per cent. artificial.
953	Red Fox Whiskey ("Blend")	J. G. Plante & Co., Manchester	44.90	.40	Mainly artificial.
954*	Fleur De Lis Whiskey	J. G. Plante & Co. Manchester	44.00	.22	Compounded; misbranded.
955*	Hunter's Baltimore Rye Whiskey	J. G. Plante & Co., Manchester	44.20	.28	Compounded; misbranded.
956	G. O. Blake Whiskey ("Blend")	J. G. Plante & Co., Manchester	46.00	.35	Compounded.
957	Gibson's Pure Rye Whiskey	J. G. Plante & Co., Manchester	45.30	.13	
958	Benedict Rye Whiskey ("Blend")	P. Harrington Sons, Manchester	45.60	.48	Compounded.
959	Mt. Vernon Rye Whiskey ("Blend")	P. Harrington Sons, Manchester	45.40	.51	Compounded.

960	Irish Whiskey	J. G. Plante & Co., Manchester	46.20	.20	Compounded; misbranded.
961	Amoskeag Rye Whiskey ("Blend")	P. Harrington Sons, Manchester	44.70	.47	Compounded.
962	Diamond Rye Whiskey ("Compound")	P. Harrington Sons, Manchester	37.70	.14	Compounded; alcohol low.
963	Pure Cutler Rye Whiskey	J. G. Plante & Co., Manchester	49.10	.35	Compounded; misbranded.
964	Cutler Bourbon Whiskey	J. G. Plante & Co., Manchester	48.40	.35	Compounded; misbranded.
965	Exchange Club Whiskey "Blend"	P. Harrington Sons, Manchester	46.70	.55	Compounded.
966	Van Dyke's Valley Stream Whiskey	J. G. Plante & Co., Manchester	34.30	.13	Mainly imitation; misbranded; alcohol very low.
967	Rum	P. Harrington Sons, Manchester	45.35	.15	
968	Nelson's Bourbon Whiskey ("Blend")	P. Harrington Sons, Manchester	45.40	.52	Compounded.
969	Rum	P. Harrington Sons, Manchester	39.35	.07	Low alcohol.
970	Gin	Thomas G. Clancy, Manchester	30.95	.02	Watered.
971	Gin	M. Connor, Manchester	35.10	.02	Alcohol very low.
972	Gin	M. Connor, Manchester	45.80	.004	
973	Amoskeag Whiskey ("Blend")	M. Connor, Manchester	44.90	.44	Compounded.
974	Rock and Rye Whiskey	M. Connor, Manchester	37.10	18.64	
975	Finch's Golden Wedding Whiskey ("Blend")	Hohman & Bartlett, Manchester	45.60	.73	Compounded.
976	Old Charter Whiskey	M. Connor, Manchester	45.00	.63	Compounded; misbranded.
977	Gilded Age Whiskey	Thomas Clancy, Manchester	43.00	.45	Compounded; misbranded.
978	Monogram Pure Old Rye Whiskey	Thomas Clancy, Manchester	42.70	.79	Compounded; misbranded.
979	Maryland Rye Whiskey ("Blend")	Hohman & Bartlett, Manchester	45.50	.37	Compounded.
980	Anchorage Whiskey	Hohman & Bartlett, Manchester	44.60	.20	
981	Gibson's Pure Old Rye Whiskey	Hohman & Bartlett, Manchester	44.90	.24	Compounded; misbranded.
982	Merrimack Rye Whiskey ("Blend")	Hohman & Bartlett, Manchester	43.85	.16	Compounded.
983	Rum	M. Connor, Manchester	40.30	.08	
984	Rum	Thomas G. Clancy, Manchester	37.45	.09	Alcohol low.
985	Blue Grass Whiskey "Blend"	M. Connor, Manchester	44.90	.51	Compounded.
986	Whiskey	Thomas G. Clancy, Manchester	36.80	.18	Compounded; alcohol low.

* Bottled by Pichette & Champoux.

RESULTS OF ANALYSES OF DISTILLED LIQUORS.—*Continued.*

Number.	Brand.	Collected of	Alcohol, per cent.	Solids, per cent.	Character.
987	Gibson's Pure Rye Whiskey.	M. Connor, Manchester	44.00	.80	Compounded; misbranded.
988	Fine Old Rye Whiskey	Thomas G. Clancy, Manchester	43.20	.42	Compounded; misbranded.
989	Diamond Whiskey	M. Connor, Manchester	37.60	.14	Compounded; misbranded; alcohol low.
990	Nelson's Whiskey ("Blend")	M. Connor, Manchester	45.50	.46	Compounded.
991*	Old Fashioned Mayfair Whiskey	Thomas La Port, Manchester	43.70	.30	Compounded; misbranded.
992†	Compound Whiskey	Eugene Sigrist, Manchester	37.60	.13	Imitation; alcohol low.
993	Pepper Hand Made Sour Mash Rye Whiskey	Quirin Bros., Manchester	45.80	.16	
994	Green Valley Club Straight Whiskey	Quirin Bros., Manchester	46.60	.13	Compounded; misbranded.
995	Hunter Rye Whiskey ("Blend")	Quirin Bros., Manchester	45.80	.23	Compounded.
996	Royal Crown Old Rye Whiskey	Quirin Bros., Manchester	45.00	.43	Compounded; misbranded.
997	Rosemont Whiskey	Eugene Sigrist, Manchester	46.60	.96	Compounded; misbranded.
998†	Compound Whiskey	Thomas La Port, Manchester	35.45	.16	Imitation; alcohol low.
999†	Compound Whiskey	Quirin Bros., Manchester	36.70	.13	Imitation; alcohol low.
1000	Maryland High Grade Old Fashioned Rye Whiskey	Thomas La Porte, Manchester	45.20	.34	Compounded; misbranded.
1001	Whiskey	J. P. Chatel, Manchester	44.85	.13	
1002	Whiskey	J. P. Chatel, Manchester	45.70	.14	
1003	Whiskey	J. P. Chatel, Manchester	52.00	.37	
1004	Old Baker Whiskey ("Blend")	Quirin Bros., Manchester	44.70	.37	Compounded.
1005*	Paul Jones Whiskey ("Blend")	Quirin Bros., Manchester	40.10	.15	Compounded; alcohol low.

* See No. 914.

1006	Whiskey	J. P. Chatel, Manchester	44.30	.12	
1007	Pleasant Valley Whiskey	Joseph Gagnon, Manchester	44.80	.44	Compounded; misbranded.
1008	Finch's Golden Wedding Pure Rye Whiskey	J. P. Chatel, Manchester	46.35	.19	
1009	Compound Whiskey	Joseph Gagnon, Manchester	37.25	.13	Mainly imitation; alcohol low.
1010	Whiskey	J. P. Chatel, Manchester.	41.00	.10	Alcohol low.
1011	Rum	Pilawski & Olesniewicz, Manchester	37.95	.17	Alcohol low.
1012	Diamond Whiskey	Pilawski & Olesniewicz, Manchester	36.55	.15	Compounded; misbranded; alcohol low.
1013	Whiskey	Pilawski & Olesniewicz, Manchester	45.30	.56	
1014	Rum	Pilawski & Olesniewicz, Manchester	43.60	.09	
1015	Gin	Pilawski & Olesniewicz, Manchester	37.35	.02	Alcohol low.
1016	Mac Brayer Whiskey, "Very Old"	Dowd Bros., Manchester.	44.50	72	Compounded; misbranded.
1017	Whiskey	Dowd Bros., Manchester	33.25	14	Compounded; alcohol very low.
1018	D. D. D. Whiskey ("Blend")	Dowd Bros., Manchester	44.40	.72	Compounded.
1019‡	Old Crow Sour Mash Bourbon Whiskey	Dowd Bros., Manchester	44.40	.70	Compounded; misbranded.
1020	Hermitage Pure Rye Whiskey	Dowd Bros., Manchester	44.50	.98	Compounded; misbranded.
1021	Gibsonia Whiskey	Pilawski & Olesniewicz, Manchester	47.20	.34	Compounded; misbranded.
1022	Compound Whiskey	Joseph Bienvenue, Manchester	44.10	15	Mainly imitation.
1023	Montreal Malt Rye Whiskey	Joseph Bienvenue, Manchester	55.50	2.15	Compounded and sweetened; misbranded.
1024	Rum	Joseph Bienvenue, Manchester	36.20	.13	Alcohol low.
1025	Rum	Joseph Bienvenue, Manchester	50.97	.11	
1026	Compound Whiskey	Joseph Bienvenue, Manchester	35.40	.23	Imitation; alcohol low.
1027	Whiskey	Joseph Bienvenue, Manchester	56.30	.28	
1028	Gin	Joseph Bienvenue, Manchester	37.20	.02	Alcohol low.
1029	Whiskey	James Gillespie, Somersworth	46.30	.84	Compounded.
1030	Whiskey	M. J. Leary, Somersworth	45.40	.26	Compounded.

* Labeled on back of bottle as a "fine blend."
† Sold as "compound"; contains no appreciable amount of genuine whiskey—therefore cannot be termed a compound.
‡ Odor of cinnamon.

RESULTS OF ANALYSES OF DISTILLED LIQUORS.—*Concluded.*

Number.	Brand.	Collected of	Alcohol, per cent.	Solids, per cent.	Character.
1031	Whiskey	Louis Gagne, Somersworth	46.30	.72	Compounded.
1032	Whiskey	Pierre Morin, Somersworth	43.30	.15	Compounded.
1033	Whiskey	P. Dumais, Somersworth	42.95	.18	Compounded.
1034	Palmyra Rye Whiskey	Henry T. Hayes, Rochester	45.20	.42	Compounded.
1035	Wilson's Whiskey ("Blend")	George J. Friel, Dover	43.90	.20	Compounded.
1036	Purity Old Rye Whiskey	David Casselle, Dover	43.50	.13	Artificial; misbranded.
1038	Petts' Bald Eagle Whiskey ("Blend")	Albert Marcotte, Dover	45.90	.29	Compounded.
1039	Gilt Edge Whiskey	John H. Lord, Farmington	43.80	.64	Compounded; misbranded.
1040	Eureka Rye Whiskey	John Walsh, Farmington	39.20	.67	Some artificial; alcohol low; misbranded.
1041	Elm Hill Whiskey	J. P. B. Roberts, Farmington	43.85	.15	
1042	Metropolitan Rye Whiskey	H. C. McFadden, Wolfeboro	39.30	.22	Mainly artificial; alcohol low; misbranded.
1043	Brook House Rye Whiskey	H. C. McFadden, Wolfeboro	45.50	.19	Compounded; misbranded.
1044	Monogram Pure Old Maryland Rye Whiskey	Jos. W. Robbins, Wolfeboro	37.50	.20	Wholly artificial; misbranded; alcohol low.
1045	Washington Club Pure Old Rye Whiskey ("Blend")	Jos. F. Cassidy, Rochester	44.40	.60	Mainly artificial.
1046	Eighty-four Whiskey ("Blend")	R. D. Burnham, Rochester	41.10	.34	Compounded.
1047	Taylor's Hand Made Sour Mash Rye Whiskey	Henry McCarty, Dover	41.40	.73	Compounded; misbranded; alcohol low.
1048	Dimple Whiskey	D. J. Durkin, Dover	40.20	.11	Compounded; misbranded; alcohol low.
1049	Whiskey	Peter Bouchard, Nashua	34.70	.11	Artificial; alcohol very low.
1050	Rum	Jos. Paul, Nashua	39.50	.10	Alcohol low.

1051	Berry's Diamond Wedding Whiskey	Jos. Sulvail, Nashua	45.50	.47	Compounded; misbranded.
1052	Monogram Pure Old Maryland Rye Whiskey, Old Fashioned Process.	Napoleon Lajoie, Nashua	46.50	.42	Compounded; misbranded.
1053	Blue Grass Pure Rye Whiskey	Sulvail & Avard, Nashua	46.75	12	Compounded; misbranded.
1054	Woodford Whiskey	Jos. Paul, Nashua	42.90	.43	Compounded; misbranded.
1055	Whiskey	Jos. Kashulino, Nashua	33.30	.13	Mainly imitation; alcohol very low.
1056	Whiskey	Pokauvwski & Co., Nashua	30.20	11	Mainly artificial; alcohol very low.
1057	Whiskey	William Corossa, Nashua	33.40	.12	Mainly artificial; alcohol very low.
1058	Twentieth Century Rye Whiskey ("Blend")	C. A. Gilmore, Nashua	44.80	.88	Compounded; misbranded.

EXAMINATION OF WINES.

770	Sherry Wine	Emil Kuchnell, Manchester	20.40	6.07	Passed.
777	Port Wine	C. L. Wolf, Manchester	19.70	12.06	Passed.
828	Port Wine	M. Connor, Manchester	16.90	9.99	Passed.
843	Port Wine	Jos. Routhier, Somersworth	17.50	11.31	Passed.
844	Port Wine	James W. Locke, Farmington	17.40	10.01	Passed.
845	Port Wine	Edward Maguire, Somersworth	19.50	13.94	Passed.

EXAMINATION OF MALT BEVERAGES.

791	Zeltner Lager Beer	Robert Schneider, Manchester	5.75	3.74	No preservative.
1059	Ale	J. J. Flood, Nashua	5.10	2.84	No preservative.

[Signed] C. D. HOWARD,
Chemist.

CANINE RABIES.

CANINE RABIES.

REPORT OF THE WORK DONE FROM DECEMBER 26, 1906, TO AUGUST 31, 1908, IN THE STATE LABORATORY OF HYGIENE.

HOWARD N. KINGSFORD, A. M., M. D., *State Bacteriologist.*
GEORGE S. GRAHAM, B. L., M. D., *Assistant Bacteriologist.*

Summary of cases:

Number of dogs examined	30
Positive	17
Negative	13

Distribution of cases:

Towns.	Positive.	Negative.
Amherst	1	0
Bedford	1	0
Claremont	0	2
Concord	4	2
Contoocook	0	1
Derry	2	1
Epping	1	0
Goffstown	0	1
Henniker	1	1
Hillsborough	1	0
Hinsdale	1	1
Keene	1	0
Manchester	1	1
Milford	1	0
Pelham	0	1
Penacook	1	0
Suncook	1	0
South Weare	0	1
West Newbury, Vt.	0	1
	17	13

Occurrence by months:

	Positive.	Negative.
January	3	3
February	3	0
March	0	0
April	0	0
May	2	2
June	2	3
July	0	0
August	0	2
September	2	2
October	1	0
November	0	0
December	4	1
	17	13

Occurrence by season:

		Positive.	Negative.
Winter, whole number of dogs examined	14	10	4
Spring, whole number of dogs examined	4	2	2
Summer, whole number of dogs examined	7	2	5
Autumn, whole number of dogs examined	5	3	2
Totals	30	17	13

NOTE: These reports cover 20 months, including 5 months of winter, 6 of spring, 6 of summer, and 3 of autumn.

The history of hydrophobia extends back to the remotest antiquity. Homer was the first to mention the disease in writing and from then down through history we find allusions to it. Until recently the disease was entirely a mystery. The ancients noticed that in the great majority of cases it proceeded directly from inoculation by the bite of a rabid animal, but since in some cases there seemed to be no bite, some writers believed that it was developed spontaneously.

Practically all of our present knowledge of the disease has been brought out during the latter part of the 19th century and even within the last few years. Before this time all sorts of mythical theories and cures were held for the disease, but now it became absolutely known that hydrophobia or rabies is an infectious disease, the symptoms being produced by a virus acting upon the nervous system The specific virus appears to originate in dogs, wolves and jackals, and may be communicated by wounds inflicted by rabid animals upon each other or upon man.

The lesions are not constant or characteristic but consist mainly of a proliferation of the endothelial cells of the capsule and of the ganglion cells of the central nervous system, with the result that the ganglion cell gradually becomes invaded and is finally destroyed, its place being occupied by new formed cells. The changes are most pronounced in the medulla-oblongata, pons, spinal cord, brain and the large ganglia. Small hemorrhagic accumulations of leukocytes may also be seen in the perivascular lymph spaces about the blood vessels and ganglion cells of these parts.

A few post mortem lesions may be present. The canine teeth are often broken, the glands of the neck are enlarged and congested, the tonsils inflamed and the epiglottis injected. The membranes of the cord may also be congested. The stomach may contain sticks, straw and other foreign substances swallowed by the dog, and such evidence of the dogs' lack of sanity was a large factor in diagnosis in the early post mortem examinations. All these conditions may be present, or some only, or they may be entirely absent and it is this fact which has made our present methods of diagnosis of such value.

In the absence of characteristic symptoms and lesions there was always a doubt as to whether or not the suspected animal was truly suffering from the disease and therefore capable of communicating it.

But in 1903 the discovery was made by Negri, an Italian observer, that in true rabies there are always present in the brain of the animal certain bodies now known as Negri bodies. The bodies he believed to be protozoa and to be the specific cause of rabies.

Negri found the bodies in the cytoplasm of the nerve cells of the brain, cord and ganglia. They were not numerous, they varied widely in size from minute almost invisible dots to bodies 1/1,000 of an inch in size stained distinctly with eosin and contained in many cases in their interior bodies which remained as a rule unstained.

(See Palte I.)

Negri found also that the bodies were universally present in considerable numbers in the Purkinje cells of the cerebellum and were almost invariably found in great numbers and in large size in the cells of Amon's Horn (Hippocampus Major), which is the part of the brain generally taken in the laboratories for examination.

At present the exact nature of the Negri bodies is not known but several very plausible theories have been advanced. The protozoan is upheld by the majority of scientists today, and the structure and staining qualities of the bodies seem to be consistent with this assumption. Their uniform presence in rabies, together with their absence in diseases other

than rabies seem to justify the assumption of their etiological relationship to hydrophobia.

Babes has studied the Negri bodies extensively and his interpretation of their appearances differs from that of most of the other experimenters. He confirms the almost constant presence of the Negri bodies in rabies, but regards them as the expression of a powerful local reaction of the cell to the invasion of the actual parasite, terminating in the envelopment of the parasite by the cell. He describes the actual parasite as being made up of certain fine granules, round and dark blue when stained, which are found exclusively in the cytoplasm of the degenerated nerve cells in the most severely affected parts of the nervous system. These granules represent the parasites in their full activity while the Negri bodies represent encapsulated forms of the parasite in a phase of involution or transformation and are found only in cells, little if at all modified, and not intimately connected with the principal symptoms of the disease.

The presence of the Negri bodies is a proof of rabies as truly as the presence of the tubercle bacillus is a proof of tuberculosis, though it may also be said that the inability to demonstrate the bodies does not absolutely exclude the possible existence of rabies. Frothingham tells of cases in which the Negri bodies could not be found in the Hippocampus Major, but which presented certain lesions in the Gasserian Gangloin. These cases proved by inoculation to be rabies. Fortunately such cases are very rare that the absence of Negri bodies is accepted as meaning that the animal examined did not have rabies.

About the year 1885, Pasteur, after long study and experimentation, obtained his fixed virus, which has proved to be the only cure for rabies. The discovery that the Pasteur method of treatment would prevent or cure the disease has led to the establishment of institutes or hospitals devoted solely to the treatment of those bitten by dogs known or thought to have rabies.

In taking up the Pasteur treatment it may be well to consider the experiments by which Pasteur arrived at his results as well as the results themselves. Pasteur placed the study of hydrophobia above every other in his researches, for he said that the mystery of the disease haunted his mind. Three things were positively known about rabies when he began this study: first, that the virus of rabies was contained in the saliva of the mad animals; second, that it was communicated through bites; third, that the period of incubation might vary from a few days to several months.

Pasteur began his experiments by using saliva for inoculation, but as this proved unsatisfactory he turned to the spinal cords and brains

PLATE I.

Ganglion cells nuclei, nucleoli and Negri bodies. The Negri bodies (shown in red) re in all cases in the protoplasm of the cells, though two, lying on the nuclei, appear to be ontained in them.

Case 9. Magnification 1200 diam.

of rabid animals. He made emulsions of the cord and injected them subcutaneously into healthy dogs with the result that they all became affected by the disease. He then sought for a means of shortening the incubation period, and by trephining the skull and inoculating the brain directly he succeeded in producing the disease in fourteen days after the inoculation. By repeated inoculations from one trephined and inoculated animal to a healthy one the incubation period was further shortened to seven days. These results spurred Pasteur on and he now sought a method of decreasing the virulence, through which he hoped that dogs could be made refractory to rabies. He placed a section of the medulla of a rabbit, dead of rabies, in a jar kept at a constant temperature and dryness. As the medulla dried its virulence decreased until at the end of fourteen days it had become absolutely extinguished. The now inactive medulla was then crushed, mixed with water and injected under the skin of dogs (test animals). The next day a portion of medulla which had dried for thirteen days was injected and so on, gradually increasing the strength of virulence until the medulla of a rabbit dead the same day was used. These dogs so treated he caused to be bitten by rabid dogs and also submitted to intracranial inoculations of the deadly virus but found that they resisted infection.

Pasteur immediately verified his experiments before a large commission of French scientists. The question naturally arose: Could this refractory condition to inoculation be produced in man? Pasteur was urged to experiment on human beings but he could not do this when he thought of the awful death failure would bring for the person experimented upon. However, the opportunity came unlooked for. In July, 1885, John Meister, a little Alsatian boy, terribly bitten by a mad dog, was brought into his laboratory. Pasteur was greatly moved at the sight of the boy's wounds and wished he could do something for him. Could he risk the preventive treatment which had become constantly successful on his dogs? He was divided between his hopes and his scruples but being urged by his fellow-workers he consented to try the treatment. It was decided to make the first inoculation immediately. The substance chosen was fourteen days old and had quite lost its virulence. It was to be followed by further inoculations of gradually-increasing strength. It was a very slight operation—merely a subcutaneous injection into the side of a few drops of an emulsion prepared from some fragments of the medulla. This inoculation was followed on the next day by material a little more virulent and this method of increasing doses kept up for ten days. On July 16th Pasteur inoculated with a medulla only one day old, which on experiment had produced rabies in a rabbit after only seven days' incuba-

tion. It was the surest test of immunity. The boy went home cured of his wounds and happy.

With this start other cases came to be treated. The same procedure was carried out as with the Meister boy, with the remarkable result that within a short time 350 people had been treated and of these only one had died. This fatal case had existed several days before going to the laboratory. The treatment of patients now became the chief business of the day at the laboratory. In a little room, permanently kept at a temperature of 20 to 23° C., stood rows of sterilized flasks, their tubular openings closed by plugs of cotton wool. Each flask contained a rabic medulla hanging from the stopper by a thread and gradually drying up by the action of fragments of caustic potash lying at the bottom of the flask. These medullæ were cut into small pieces by means of scissors, previously put through a flame for sterilization, and then kept in small sterilized glasses after a few drops of veal broth had been added and the mixture pounded with a glass rod. The vaciana fluid was now ready for use. Each glass jar was covered with a paper cover which bore the date of the medulla used; the earliest one was fourteen days old. For each patient under treatment there was a whole series of little glasses, one of which was used for each inoculation.

The great importance of the discovery was immediately recognized all over the world, and although, as is usual with great discoveries, some opposition was raised toward the treatment, this amounted to nothing. Immediately the demand arose in all the larger cities for the foundation of institutes for the treatment of persons bitten by rabid animals. These were quickly established. They were known almost from the beginning as Pasteur institutes and today they are found in a great many cities all over the world. Today a person bitten by a rabid dog can get to one of these institutes within a few hours from the time that the bite occurred and there receive practically the same treatment as that by which Pasteur saved the life of John Meister and proved that rabies could be avoided by a preventive treatment.

The methods of examination in use at the New Hampshire State Laboratory are as follows: Smears were taken from the motor cortex of the brain and from the Hippocampus Major (Ammon's Horn) and fixed in Zenker's fluid and stained with Eosin and Methyline Blue (Unna's Stain). Blocks of tissue were taken from the motor cortex of the brain and from Ammon's Horn fixed in Zenker's fluid, cut in paraffine and stained with Unna's stain. Animals were inoculated with emulsions of the brain and cord in the first twelve cases; sub-dural and eye inoculations were made. The results in every case were identical with the smear results, conse-

quently animal inoculations were not made in the last eighteen cases. The animals developed the disease in from twelve to sixteen days except in one case where it was about one month. The negative animals were killed at the end of three months.

Many of the dogs' heads were battered and bruised to such an extent that the brain substance was simply a pulp and a satisfactory examination was very difficult. Many of the heads had been kept so long that post-mortem degeneration and liquifaction made satisfactory examination difficult. Most of the dogs had been killed by shooting through the head. An examination of the histories of the cases submitted to the laboratory will demonstrate the necessity for a wider knowledge of the symptoms of rabies, and of the proper methods of procedure in such cases.

HISTORY OF THE CASES.

Number 1.—Positive.

December 28, 1906. Henniker and Weare.

About one week ago, a dog, uncollared, owner unknown, ran amuck in Henniker and Weare, biting several dogs and injuring two or three persons to some extent. The dog was finally shot in Weare and was immediately buried. This was about five days ago.

Gross Description: Head and neck of a brownish dog, long-haired (Irish setter). Left upper canine tooth shows a recently-fractured tip. Other teeth normal. The neck shows extensive hemorrhage and edema of the subcutaneous tissue, hemorrhage present in the lower larynx. Hemorrhage is evidently due to trauma. On removing the calvarium blood vessels of the meninges are found to be deeply injected. No exudate or other evidence of meningitis is present.

There are no softenings, tumors, hemorrhages, or other gross alterations beyond the congestion noted. On section, the brain is soft (post-mortem change). The smaller vessels of both gray and white matter are deeply injected, cut surfaces showing diffuse dark red ecchymotic points and lines. A similar appearance is found in the basal ganglia and in the floor of the fourth ventricle. The cerebro-spinal fluid of the lateral ventricles is clear, not increased in amount. The cord shows slight meningal injection. At the level of the fourth cervical vertebræ there is an area of hemorrhage and edema distending the meninges and covering their surface. This area is 3.5 cm. long. It is probably due to the trauma applied just before or just after death. There is no fracture of the vertebræ.

Microscopical Examination: The vessels everywhere are deeply injected, there is occasionally slight interstitial hemorrhage, and the perivascular spaces are frequently crowded with leukocytes. Such changes are found particularly in the medulla, where the ganglionic cells often show degenerative changes, but these may be post-mortem. The histology of the nerve cells themselves is of little value in the present case because of the marked changes which have taken place in the several days since the dog was killed.

The dog shows no gross lesion to account for his peculiar actions. The changes found microscopically, namely, minute hemorrhages, perivascular accumulation of leukocytes, small collections of leukocytes in the nuclear areas of the medulla, are all found in rabies and while they are no absolute proof of that disease, they point strongly toward it. Any persons injured by this dog should be kept under close observation and any dogs that have been bitten, killed.

Animals have been inoculated but the result will not be known for from fourteen to sixteen days.

Both animals inoculated in this case developed rabies, but not until after about one month had passed.

Number 2.—Negative.

January 4, 1907. Pelham.

The dog belonged to Guy A. Lewis. A hound dog, and was kept chained most of the time, but was untied the morning he was killed. It was thought by the neighbors who knew the dog that he appeared different from usual, as he ran all about the common and got into a squabble with several dogs. He was then chained up. Mr. Lewis' brother was sent for to pass judgment on him in regard to rabies (the owner being away). The dog snapped at him as he went to look into his mouth; it was thought he might have been bitten by a mad dog and was consequently shot. The dogs he had been seen squabbling with were either kept confined or shot till the dog's head had been examined and pronounced all right. No trouble occurred afterwards and most of the neighbors thought at the time that the dog was all right.

Gross Description: Head of a dog, the hair short, brown in color. The head has been cut off apparently by a heavy dull instrument, the resulting injury having torn off a portion of the occipital bone, exposing and lacerating the cerebellum, only a portion of which remains. The medulla cannot be found, it having been crushed or torn away. On removing the calvarium the meninges are injected and moist. The vessels of the pia

are injected. The lateral ventricles contain a small amount of bloody fluid, apparently due to injury received by severing the head. Cut surface of brain tissue is rather soft and moist, otherwise negative.

Microscopical Examination: Smears and tissue from Hippocampus Major and basal ganglia. Negative animal inoculation. Eye anterior chamber, after three months, negative.

NUMBER 3.—NEGATIVE.

January 14, 1907. Concord.

The dog was found roaming the streets of Concord, N. H., acting suspiciously; was killed by a police officer. The owner's name not known.

Gross Description: Head and neck of a long-haired, light brown dog (collie). Inspection shows nothing remarkable. The right upper canine tooth is blunt at the tip, this condition evidently being of long standing. On removing the calvarium, the dura is found rather closely adherent to the inner table; the portion covering the upper portion of the cerebellar lobes and a portion of the velum interpostium contain several small sheets of parchment-like sclerosis. The pial vessels are slightly injected.

On section the brain tissue is slightly softened, both lateral ventricles contain a considerable amount of clear colorless fluid. There are no gross pathological changes visible beyond the evidence of chronic meningitis above noted. Cerebellum and medulla negative. The meningeal vessels of the cord are slightly injected, otherwise no evidence of diseased condition.

Microscopical Description: Smears and tissue negative.

Animal Inoculation: Eye, after three months, negative. Any unusual cerebral symptoms by the animal may be credited to the presence of a pachy meningitis.

NUMBER 4.—POSITIVE.

February 15, 1907. Derry.

History: Heads of two dogs that recently died or were killed and were claimed in town to have had rabies. The shepherd dog belongs to Mr. Fred Frost. He was bitten by a supposedly mad dog about two weeks previous to his sickness. The doctors claim here that both died from the disease; although it is uncertain whether the black and white dog was bitten at the time of the "scare." About twenty dogs were bitten and nearly all of them have been killed or have died.

Gross Description: Head and neck of a shepherd dog belonging to Mr. Frost. No evidences of diseased teeth found. Calvarium removed

and the blood vessels of the brain found to be markedly injected and considerable straw colored fluid is found in the sulci, enough to bulge the membranes.

Microscopical Description: Smears and tissue positive.

Animal Inoculation: Sub-dural. Positive, 14 days.

NUMBER 5.—POSITIVE.

February 15, 1907. Derry.

History: Same as No. 4.

Head and neck of a black and white dog (mongrel). The calvarium removed and the blood vessels markedly injected and numerous small hemorrhages were seen along the course of the blood vessels; also a small amount of thick yellowish fluid around the sulci.

Microscopical Description: Smears and tissue positive.

Animal Inoculation: Eye positive, 16 days.

NUMBER 6.—POSITIVE.

May 16, 1907. Hillsborough.

History: Black and white shepherd dog which had been showing symptoms of rabies sent alive to the laboratory. The dog died at White River Junction, Vermont. The body was warm when it reached the laboratory.

Gross Description: Autopsy showed nothing remarkable about the stomach and intestines and the other organs appeared normal. On opening the skull the meningeal vessels were found to be rather markedly injected; this injection extended into the vessels of the meninges and cord. There was slight sub-pial edema. The blood vessels of the anterior brain were also somewhat injected. No further gross evidence of disease was found.

Microscopical Description: Smears and tissue positive.

Animal Inoculation: Both sub-dural and eye positive after 30 days.

NUMBER 7.—NEGATIVE.

May 28, 1907. Manchester.

History: The dog was killed by the Manchester police; nothing known about the dog, except that he was acting suspiciously, snapping at several people.

Gross Description: Whole dog sent. Stomach and other organs negative. Small black and white, short-haired dog; hemorrhage from mouth,

nose and ears. On incising the scalp, considerable hemorrhage is found in the muscular and cellular tissues covering the calvarium. The latter is extensively fractured. Removal of the calvarium shows sub-dural and extra-dural hemorrhages. The brain tissue shows rather marked softenings and post-mortem changes. The condition of the tissues renders animal inoculations very unsatisfactory.

Microscopical Examination: Smear and tissue negative.

Animal Inoculation: Sub-dural negative after three months.

Number 8.—Negative.

May 29, 1907. Contoocook.

History: The dog was a stray, owner unknown. He came into the village in the afternoon. No person was bitten by him but he did snap at Prof. E. E. Sawyer, catching hold of his coat sleeve so that the dog was lifted from the ground. It was reported that several dogs were bitten by him but so far as is known no serious results followed. The next morning the dog was found lying at the front of one of the stores, apparently in a semi-torpid condition. He was killed soon afterwards.

Gross Description: The head was very much decomposed and the skull fractured in a number of places. The brain was very much softened so that the relations of the blood vessels to the other tissues could not be made out.

Microscopical Description: Smears and sections negative.

Animal Inoculation: Sub-dural negative after three months.

Number 9.—Positive.

June 13, 1907. Manchester.

History: Dog shot by the police because he was acting strangely but so far as is known no one was bitten by him. It was apparently a stray dog and the owner could not be found.

Gross Description: Head of a small brown-and-white, long-haired spaniel dog. The scalp was soaked with blood, especially about the occiput. Skull was extensively fractured. There was marked meningeal hemorrhage. Pial vessels were filled with blood. The cerrebellum and medulla were crushed by broken fragments of bone. The cerrebellum was the only portion of the brain that was available for examination.

Microscopical Description: Smears and tissue positive.

Animal inoculation: Sub-dural; positive after twelve days.

NUMBER 10.—NEGATIVE.

June 16, 1907. Derry.

History: Owner of dog not known; was a stray dog never seen here before. Dr. Sanders saw nothing wrong about the dog. The dog went into a dooryard and the children played with him, when the house dog, a bull terrier, got jealous and pitched into him. The dog did not offer to bite anyone and was a harmless, good-natured dog. After the fight, which was n't of any account, the family wanted the dog killed and the head examined as a precautionary measure to their dog.

Gross Description: Head of a dog, hair medium length, black, white and yellow in color. About four inches of the neck is attached to the head. The skull is in good condition, not having been fractured. On removing the calvarium the meninges are not injected but are quite moist. The brain is in a state of marked decomposition. The vessels of the pia are empty and do not show any evidence of having been distended. The ventricles are negative.

Microscopical Description: Smears and tissue negative.

Animal Inoculation: Eye; negative after three months.

NUMBER 11.—NEGATIVE.

June 17, 1907. South Weare.

History: Owner's name, J. H. Eastman. The dog did not bite any one. The symptoms were, frothing at the mouth, no desire to eat or take notice, a disposition to conceal himself, followed by weakness. The dog remained this way for about two weeks.

Gross Description: Head and a small part of the neck of a black, white and light yellow dog. Hair short. The skull is fractured on the left side and about two inches back of the left eye. On removing the calvarium, the meninges are injected deeply and quite moist. The vessels of the pia are also injected. The left side of the cerebrum and cerebellum is considerably crushed and the outlines of the brain very much distorted. The lateral ventricles of the left side contain a small clot. The right ventricle is found to be negative.

Microscopical Description: Smears and tissue negative.

Animal Inoculation: Sub-dural; negative after three months.

NUMBER 12.—NEGATIVE.

June 19, 1907. Henniker.

History: Owner of dog, Peter Longway. Dog did not bite anyone; was a female and just weaned some puppies. She had been chained for some time and when she was let loose she ran away.

Gross Description: Head of a short-haired, black-and-white dog. The upper portion of the neck is attached to the head. The tissue covering the skull contains a considerable number of B. B. shot. One shot has penetrated the skull in the frontal region on the right side. On removing the calvarium a large superficial hemorrhage covers the upper and lateral anterior surface of left cerebrum. Meningeal vessels are injected. The brain is in a fair state of preservation. There is a small amount of fluid on the floor of both ventricles.

Microscopical Description: Smears and blocks negative.

Animal Inoculation: Sub-dural; negative after three months.

NUMBER 13.—POSITIVE.

June 24, 1907. Concord.

History: Dog owned by Mr. Devrack of Hopkinton, who also owned four other dogs. The dog was brought to Dr. Burchsted's office acting queerly and being very nervous. The second day he commenced to bite and chew everything he could get hold of. That night he ate up a wooden box. The doctor went away the next day. The dog howled continuously and jumped through a screen door. The previous history was that he had been with another dog who had acted practically the same way and who had died about one week before in convulsions.

Gross Description: Specimen consists of the head and upper neck of a small, short-nosed, brown-and-white, curly-haired dog (King Charles spaniel). On removing the calvarium, the meninges were very much injected, the superior longitudinal sinus was filled with dark red blood. The brain tissue was softened about the frontal and basal region.

Microscopical Examination: Smears and tissue positive.

NUMBER 14.—NEGATIVE.

August 19, 1907. Hinsdale.

History: The dog had been acting suspiciously and had bitten a number of dogs.

Gross Description: Head of a large black-and-brindle dog which is in a very marked stage of decomposition. The skull is pierced between the eyes by a small hole. The skull is also fractured in a number of places. The brain tissue is markedly softened and many particles of bone are found in the brain substance. Considerable distention of the larger blood vessels is seen but the very marked decomposition of the tissues renders a satisfactory examination impossible.

Microscopical Examination: Smears and tissue negative.

NUMBER 15.—NEGATIVE.

August 20, 1907. Goffstown.

History: Female dog owned by A. J. Richards of Goffstown. She was cross when in heat and she was in heat at this time. Mr. Richards had her shut up and one of his little girls let her out. She was a great pet and in playing with the children got into the habit of taking hold of whatever they had and pulling. She came across a young fellow working on the street and took hold of his hoe. He struck her over the head with a shovel, which seemed to daze her for a minute, and when she came to she rushed at him and bit him in the leg. Dr. Blaisdell cauterized this wound, and when the dog was next heard from she was about four miles away trying to drive in some pigs into a yard from a field. After being driven away from there, and evidently on her way home, overtook a man carrying a piece of board or stick of some kind which she took hold of. This man struck at her and she grabbed his pant leg, grazing the skin but not breaking it. The dog was then killed and sent for examination.

Gross Description: Body of a small, white-and-brown, long-haired dog, which is in quite an advanced stage of decomposition. The skull is pierced by a round hole in the median parietal region and a long fracture extends from this place backward in the median line. The brain is soft and shows nothing remarkable except the congestion of blood vessels, which is very marked.

Microscopical Examination: Smears and tissue negative.

NUMBER 16.—POSITIVE.

September 18, 1907. Hinsdale.

History: Dog owned by C. E. Savage of Hinsdale. Dog appeared not to feel well the day before he was killed. He acted dumpish and would rather lie still than to follow people about as was his custom. The next morning it was noticed that he held his jaws open and could not apparently close them. Noticed later that he did close them but they would drop apart again at once. In the afternoon he appeared to be in considerable pain, which continued to increase, and his hind parts seemed to be growing paralyzed. His bowels seemed to be full of gas and he suffered terribly. We tried to feed him bread soaked in milk but he could not eat it alone. If we placed the bread back in the back of his mouth he would swallow it all right but could not lap it up. The symptoms were in general as those given on the dog license for the dumb variety of rabies.

Gross Description: Specimen consists of the body of a dog, black in color, and in a good state of preservation. The dog was of medium size and of no particular breed. There was no evidence of disease found at the autopsy in the organs of chest and abdomen. There was no poison found in the stomach contents. On removing the calvarium, the blood vessels of the meninges are deeply injected, and the superior longitudinal sinus elevated. The brain substance is softened, and no fluid is found in the ventricles.

Microscopical Description: Smears and tissue positive.

NUMBER 17.—NEGATIVE.

September 20, 1907. Concord.

History: Dog was one which had been bitten by a dog from Lynn, Mass., where there had been rabies. There were no characteristic symptoms noticed.

Gross Description: Head of a dog in a very marked state of decomposition. Only a few of the blood vessels remain. The brain tissue is simply a pulp.

Microscopical Description: Smears and tissue negative.

NUMBER 18.—POSITIVE.

September 22, 1907. Bedford.

History: Dog belonged to H. L. Campbell. Showed symptoms of rabies and was kept in confinement. He got away and bit several dogs. The dog, when he got away, covered all of the north part of town. The dogs bitten showed symptoms of rabies and some of them were killed.

Gross Description: Head and neck of a brindle-and-white, short-haired dog (bull). Muscles of neck show symptoms of decomposition. On removing the calvarium, the dorsal meningeal blood vessels are seen to be markedly injected, as are also those of the pia. Brain tissue is soft; there is very little fluid in the ventricles.

Microscopical Description: Smears and blocks show. Positive.

NUMBER 19.—POSITIVE.

November 25, 1907. Milford.

History: Black-and-white hound, belonging to W. W. Hemenway of Milford, showed symptoms of rabies and bit a number of dogs and also a Miss Buckley, who died in about ten weeks of rabies. The hound attacked Miss Buckley's dog, and for fear that her dog would be injured,

she undertook to separate them. She was bitten in the leg and arm, and the arm wound was a very extensive laceration. A physician was called and dressed the arm wound, but was not told of the leg injury. The physician thinks her trouble came from the arm injury rather than from the leg, because the arm was so extensively lacerated that a thorough disinfection of it was impossible.

Gross Description: Head and neck of a black, long-haired dog (shepherd or collie), neck has a brass-mounted collar with padlock. On removing scalp, tissue is found to contain numerous lead shot; calvarium has been pierced by these shot and fractured extensively. Upon removing loose pieces of bone, brain is found to be shattered throughout and reduced to a bloody mass. Small piece of upper cervical cord is obtained, which is softened and deeply hemorrhagic throughout, evidently from trauma.

Microscopical Description: Slides made from brain pulp and from upper cord show the presence Negri bodies. Positive.

NUMBER 20.—POSITIVE.

December 12, 1908. Suncook.

History: Dog owned by P. P. Shute. Found in a stable about 9 p. m. Was crouched in the bay, eyes staring and lower jaw dropped, with profuse salivation and hemiplegia of his hind parts; was killed at once.

Gross Description: Black-haired, long-eared, sharp-nosed dog. Head and neck in good condition. The blood vessels of the dura are markedly injected, slight sub-dural edema. The blood vessels of the base are also injected. Punctæ cruentæ marked. Injection of the small vessels of the fourth ventricle floor.

Microscopical Examination: Smears and tissue. Positive.

NUMBER 21.—POSITIVE.

December 9, 1907. Concord.

History: Dog owned by Mr. Wright of Concord. The dog was ordered killed by Doctor Burchstead of Concord, alleging that he had rabies. The owner states that the dog did not show any symptoms of rabies. The dog gradually lost his appetite and became partially paralyzed, without any indication of being vicious or exhibiting any other marked indications of hydrophobia. The dog was chloroformed by its owner. Three other dogs were killed about this time, under suspicion.

Gross Description: The head was in good condition, the blood vessels of the brain coverings and those of the brain substance were all very

markedly injected, and there were very small petechial hemorrhages found in the blood vessels of the ventricles.

Microscopical Description: Smears and tissue. Positive.

NUMBER 22.—POSITIVE.

December 12, 1907. Concord.

History: Dog owned by Fred B. Clough of Concord, was killed by a policeman. The dog bit Mr. Clough's daughter slightly upon the hand, enough to cause some hemorrhage.

Gross Description: Brown, short-haired dog (small). On cutting scalp, bullet hole through parietal bone, extending through skull and shattering left temporal region of brain and left lateral ventricle. There is slight decomposition present. Meningeal (pial) vessels slightly injected, punctæ cruentæ marked.

Microscopical Description: Smears from Ammon's Horn stained by the usual method show Negri bodies. Positive.

NUMBER 23.—NEGATIVE.

December 28, 1907. Bradford, Vt.

History: Dog said to have belonged to Mrs. J. Sawyer of West Newbury, Vt. Dog was about two years old. For the last few months was more or less snappy, otherwise showed no rabid symptoms. On Wednesday, December 25, the dog bit a young woman who was boarding at the house where the dog lived.

Gross Description: Black cocker spaniel. Whole dog sent. Skull is broken into small fragments and the brain substance reduced to a pulp. On account of this condition of the brain, the gross legions could not be made out.

Microscopical Description: Smears were taken, as nearly as could be determined, from the region of Ammon's Horn, hardened in Zenker's fluid and stained by the usual method. No Negri bodies were found. Negative.

NUMBER 24.—NEGATIVE.

January 7, 1908. Claremont.

History: Owner's name, Harry Williams, West Claremont. Dog was acting strangely, running around snapping at things; was tied up, a physician called, and he advised killing the dog. Dog killed with chloroform.

Gross Description: Head and neck of a short-haired, brown-and-white dog—bull terrier. Tissues in good condition; there was no evidence of

violence. The calvarium was removed and there was nothing remarkable seen in the brain coverings; the blood vessels were only slightly distended. The brain tissue seemed normal.

Microscopical Description: Smears and tissue. Negative.

NUMBER 25.—POSITIVE.

January 11, 1908. Keene.

History: Not obtainable.

Gross Description: Received from C. A. Shedd of Keene, head of a sharp-nosed, black-and-brown dog. The upper left canine tooth and upper left central incisor missing. The gum about alveolus of canine tooth torn and mass of clotted blood occupies the cavity. On opening the calvarium, sinuses of the dura are filled with chicken-fat clots; vessels of the pia are deeply injected. Punctæ cruentæ well marked.

Microscopical Description: Smears and tissue. Positive. In this case there was well-marked proliferation of the endolithelial cells of small vessels.

NUMBER 26.—POSITIVE.

February 4, 1908. Amherst.

History: Dog ran about the town of Amherst with the most violent symptoms of hydrophobia, and bit eight or nine dogs.

Gross Description: Head of a black, long-haired dog; skull has been extensively fractured by some dull instrument; the brain is lacerated, especially in the posterior portion. So much laceration is found that the relations of tissues impossible to make out.

Microscopical Description: Smears and tissue. Positive.

NUMBER 27.—POSITIVE.

February 11, 1908. Penacook.

History: Five days before death the dog was inclined to lie over the register in the house. Always very companionable, he would not notice his master after he came into the room except by a wag of the tail, although if called he would arise and appear natural for a short time, then he would go over to the register again; his nose was hot, ears cold. His master suspected distemper and gave him some fever drops. He refused solid food so milk was tried. He tried for about ten minutes to drink, but after entering the mouth it would run out with a thick mucous. This was the first noticeable symptom, slight paralysis of the throat. He was then fed on raw eggs by opening his mouth. If he remained quiet he appeared all

right, but if he moved quickly it would produce coughing and blowing. The blowing was so violent as almost to throw him from his feet. It seemed as though his head was full and he was trying to throw it out. At any time that his owner entered the room he would arise and be pleased to see him, run to the door and try to go out. This condition continued until the fourth day when his jaw was dropped, the pupil of his eyes became dilated and there was drooling at the mouth. A physician was sent for and the dog was killed.

Gross Description: Body of a brown and white pointer dog. Shot through the thorax. Body was in very good condition. On removing the calvarium the meningeal vessels were found to be very markedly injected and there was considerable edema. The pial vessels were also injected. The brain tissue was firm and no evidence of decomposition was found.

Microscopical Description: Smears and tissue positive. Sections from the cortical tissue showed numerous Negri bodies as well as the other parts.

NUMBER 28.—POSITIVE.

February 14, 1908. Concord.

History: Dog owned by G. W. Hunter was found in an entry by a policeman and killed. The dog had been acting strangely and had bitten his master.

Gross Description: Head of a black, long-haired dog (spaniel). The head was extensively fractured and the brain tissue reduced to a pulp. This destruction was especially marked in the right upper portion. There was considerable hemorrhage found in the internal brain and the remaining vessels were markedly distended.

Microscopical Description: Smears and tissue positive.

NUMBER 29.—POSITIVE.

May 12, 1908. Epping.

History: Dog had been acting strangely and had bitten several dogs.

Gross Description: Head of a brown and white, long-haired dog, long-eared (spaniel). His eyes were protruding and the right shows intraocular hemorrhage. On exposing the calvarium the skin and muscles seem to be punctured by a number of leaden shot. Calvarium removed, there appears a sub-dural hemorrhage over the right cerebrum. The brain tissue itself is hemorrhagic, while in the region of the basil ganglia there has been extensive laceration by a large bullet which lies free upon the floor of the skull cavity.

Microscopical Description: Smears and tissue positive.

NUMBER 30.—NEGATIVE.

August 30, 1908. Claremont.

History: The dog bit a man on the road, had never shown any symptoms of disease and was always good natured. Owner, C. T. Rossiter, Claremont.

Gross Description: External examination negative, the tissues being rotten. The calvarium removed and the brain was blackened and very soft. The blood vessels showed nothing remarkable.

Microscopical Description: Smears and tissue negative.

SYMPTOMS OF RABIES IN DOGS.

Rabies is a disease that originates in animals but not in man. The first symptoms in the dog are successively sullenness, pugnacity, belligerancy, a tendency to fight and a continual shifting of posture. There are two forms of the disease.

The first or furious form is characterized by an augmented activity of the sensory and locomotor systems, a disposition to bite, and a repeated, continuous, peculiar barking. The habits and disposition of the dog become altered. He licks or carries about inedible substances, is restless, snaps in the air, but nevertheless is still obedient. Soon he loses his appetite, is very thirsty. His mouth and tongue are swollen. The eyes are red, dull and half closed. The skin of the forehead is wrinkled. The coat is rough and there is a periodic disposition to bite. On being approached the animal may appear friendly but suddenly snaps. Later there is paralysis of the extremities; the breathing and deglutition are effected by spasms; the external surface is irritable and the sensorial functions are perverted and increased in activity; convulsions may occur. These symptoms are paroxysmal, remitting and intermitting, and often being excited by touch, sight or hearing.

The second, or sullen form, is characterized by shyness and depression. There is no disposition to bite nor is there any fear of fluids. The dog avoids society and refuses food. The breathing is labored; the bark harsh and altered in tone; the mouth is open because of the dropping of the lower jaw; the tongue protrudes and the saliva flows constantly from the mouth. The breathing soon becomes more difficult, with tremors, vomiting and convulsions.

The virus is usually conveyed to man in the saliva which is on the teeth of the rabid animal. Cases have even been reported of a man becoming inoculated with the disease from the scratch of a dog's claws. This is explained by the fact that the dogs had been lapping their claws and therefore the claws had become covered with saliva.

The wound by which the virus enters the system of the victim generally heals rapidly and the virus may lie concealed for periods of very variable duration, ranging from three days to many months. The incubation period is shorter in young subjects than in adults. It also varies with the part of the body bitten, being more rapid where there is a rich nerve supply in the parts bitten, and with the extent and severity of the wound, puncture wounds being the most dangerous.

HOW TO DEAL WITH SUSPECTED DOGS.

The question of what to do with a dog suspected of having rabies is one of very great importance. It will be noticed in the reports of the cases that many of the heads were badly lacerated because the dog had been killed by shooting through the head, and also that in many cases the dog was kept a few days before being sent to the laboratory, and that decomposition had taken place to a marked extent.

The suspected dog should immediately be killed by shooting through the heart or lungs, or with strychnine or some other poison. In this way the head and brain will not be injured.

The whole dog, or at least the head and neck, should be sent to the nearest pathological laboratory as soon after death as possible. Cold does not affect the diagnosis, and as the animals decompose very rapidly in warm weather it is well at such times to pack the parts in ice.

BACTERIOLOGICAL EXAMINATIONS.

BACTERIOLOGICAL EXAMINATIONS.

A large amount of work has been done at the bacteriological department of the State Laboratory of Hygiene. The examinations for the period covered by this report exceed 6,000 in special work for the detection of disease, while several hundred bacteriological examinations of water supplies for the colon bacillus and other organisms have been made. This latter work was done in connection with the chemical examination of public and private water supplies, the positive results of which are given under "Water Supplies of Towns and Cities" elsewhere in this report.

Some examinations of specimens not classified have also been made, and reports rendered to boards of health or to the persons directly interested.

SPUTUM EXAMINATIONS.

During the period covered by this report 2238 examinations of sputum for tubercle bacilli were made, the same representing 1914 different persons. Of the total number of specimens 559 were positive and 1353 negative. The table following gives the towns from which material was received, results of the examinations and the age and sex of the patients.

EXAMINATIONS FOR DIPHTHERIA.

Three thousand four hundred and seventy-eight examinations were made for the Klebs-Lœffler bacillus—2349 for diagnosis and 1129 for release from quarantine; 718 were positive and 2760 negative. The localities from which specimens were received, with results of examinations, are shown in accompanying table.

EXAMINATIONS FOR TYPHOID FEVER.

Blood from 519 patients were examined in suspected cases of typhoid was fever. A positive result was obtained in 155 cases; negative, 361. An appended table shows details.

INTERPRETATION OF RESULTS REPORTED.

We desire to impress upon the mind of every physician in the state that a bacteriological examination made at the State Laboratory of Hygiene is

solely to *assist* the physician in arriving at a correct diagnosis, and that the report which the laboratory makes, whether "positive" or "negative" is *upon the material sent.* As an illustration: A swab from a suspected case of diphtheria may be reported "negative" solely because no live diphtheria germs were entrapped when the swab was used; yet the disease may have been diphtheria. The report is made *upon the swab*, and not upon the patient. The same application of principle holds in the examination of suspected tuberculosis.

If a culture taken from the throat of a patient, who appears, clinically, to have diphtheria, reveals the Klebs-Lœffler bacillus, there can be no question as to the diagnosis; but should the culture prove negative, instead of positive, the physician should in every instance regard the result as valueless, and should not permit it to warp his judgment or treatment of the case from a clinical point of view. The physician who relies upon a primary negative result for a diagnosis of his case may find himself in serious trouble, with, perhaps, a most malignant type of diphtheria on his hands a few days later.

The laboratory does not in any instance give a diagnosis of the case; does not see the patient; knows nothing of his symptoms. It simply reports "positive" or "negative" as the result of a most careful and scientific examination of the *material received.* It remains for the physician to make the diagnosis after assembling all the facts presented and obtainable.

Park, who may be regarded as an eminent authority, says:

"Diphtheria does not occur without the presence of the diphtheria bacilli; but there have been many cases of diphtheria in which, for one or another reason, no bacilli were found in the cultures by the examiner. In many of these cases later cultures revealed them.

"In a convalescent case the absence of bacilli in any one culture indicates that there are certainly not many bacilli left in the throat. Only repeated cultures can prove their total absence."

These remarks are made because in laboratory work there is occasionally a physician who relies upon a single negative result, and the same is true of health officers in determining when a patient may be released from quarantine. In neither case is a single negative result conclusive.

SPUTUM EXAMINATIONS FOR TUBERCULOSIS, 1907, 1908.

City or Town.	Number of cases examined.	Positive.	Negative.	Doubtful.	1 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	Age not stated.	Male.	Female.	Not stated.	Number of examinations.
Acworth	2	....	2	..	..	....	1	....	1	....	....	....	....	....	....	2	..	2
Alstead	3	....	3	..	..	....	....	2	....	...	....	....	....	1	1	2	..	3
Andover	7	1	6	..	..	....	....	1	1	4	1	..	....	....	3	4	..	7
Antrim	4	1	3	..	..	....	1	1	....	....	2	....	....	....	3	1	..	4
Ashland	25	6	19	..	..	3	10	8	....	3	1	....	....	....	13	12	..	25
Barnstead	5	2	3	..	..	1	2	....	....	....	....	1	....	1	3	2	..	5
Bartlett	3	....	3	..	..	....	1	1	1	....	....	....	....	...	2	1	..	3
Bedford	2	1	1	..	..	1	....	1	....	....	....	...	....	....	1	1	..	2
Belmont	5	3	2	..	..	....	2	2	....	....	....	....	....	1	4	1	..	5
Bennington	2	1	1	..	1	....	1	...	....	...	....	....	....	....	1	1	..	2
Berlin	65	15	50	..	1	14	21	18	7	1	1	....	....	2	23	42	..	66
Bethlehem	7	1	6	..	..	....	2	3	1	1	....	....	....	....	1	6	..	7
Bristol	9	1	8	..	..	....	3	2	....	4	....	....	....	....	5	4	..	9
Brooklyn	2	2	....	..	..	1	....	....	1	....	....	....	....	....	1	1	..	2
Campton Village	2	2	....	..	..	....	1	....	....	....	1	....	....	....	1	1	..	2
Canaan	2	2	....	..	..	....	....	....	2	....	....	....	....	....	....	2	..	2
Charlestown	2	2	....	..	..	....	1	...	...	....	....	....	1	....	2	...	..	2
Chatham	2	1	1	..	..	....	....	2	....	....	....	....	....	....	1	1	..	3
Claremont	18	5	13	..	..	1	8	....	7	....	....	...	....	2	12	6	..	23
Colebrook	3	1	2	..	..	1	....	2	....	....	....	....	....	....	2	1	..	3
Concord	339	102	237	..	3	41	90	61	57	25	32	12	...	18	193	136	10	478
Contoocook	1	1	....	..	..	....	...	....	....	....	....	....	....	1	....	....	1	1
Conway	6	....	6	..	..	....	1	1	....	1	....	1	2	....	2	3	1	6
Derry	12	1	11	..	..	1	6	2	....	1	....	....	....	2	8	4	..	14
Dover	128	40	88	..	1	18	32	21	14	12	11	3	....	16	72	46	10	148
Durham	5	1	4	..	..	1	1	2	1	1	....	....	....	...	1	4	..	8
Enfield	7	5	2	..	..	....	....	....	4	3	...	....	....	....	7	....	..	7
Epping	8	2	6	..	..	....	3	2	2	1	....	....	....	....	4	4	..	8
Epsom	1	..	1	..	..	....	....	....	....	....	....	1	....	....	....	1	..	1
Exeter	28	6	22	..	2	....	10	7	8	...	1	....	....	....	8	17	3	34
Farmington	28	8	20	..	1	2	7	4	5	4	2	1	1	1	17	11	..	28
Fitzwilliam	2	1	1	..	..	....	1	....	....	....	....	1	....	....	....	2	..	2
Franconia	3	1	2	..	..	1	2	....	....	....	....	....	....	...	1	2	..	3
Franklin	74	19	55	..	3	3	15	21	13	8	6	2	2	1	36	38	..	84
Fremont	3	1	2	..	..	....	....	....	1	1	1	...	....	....	3	....	..	3

SPUTUM EXAMINATIONS FOR TUBERCULOSIS, 1907, 1908.—*Continued.*

City or Town.	Number of cases examined.	Positive.	Negative.	Doubtful.	1 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	Age not stated.	Male.	Female.	Not stated.	Number of examinations.
Goffstown	10	5	5	..	1	2	3	1	1	2	....	....	....	....	2	8	..	11
Goffstown Almshouse	32	15	17	..	..	2	6	8	9	1	4	1	1	....	28	4	..	36
Gorham	3	....	3	..	2	1	....	..	....	....	....	....	....	....	2	1	..	3
Greenland	4	1	3	..	3	1	....	....	....	....	...	....	....	....	3	1	..	4
Greenfield	2	1	1	..	..	....	....	....	1	1	....	...	....	....	1	1	..	2
Greenville	2	1	1	..	..	...	....	....	1	1	....	....	....	....	1	1	..	2
Groveton	2	1	1	..	1	....	....	....	1	....	....	....	....	....	1	1	..	2
Gilmanton	2	...	2	..	..	....	2	....	....	....	....	....	....	....	....	2	..	2
Hampton	7	4	3	..	..	1	3	....	....	1	1	1	....	....	5	2	..	11
Hanover	30	5	25	..	3	6	7	5	1	1	1	1	....	5	18	12	..	33
Haverhill	1	....	1	..	..	....	....	....	....	1	....	....	....	....	....	1	..	1
Henniker	2	....	2	..	..	....	....	1	1	....	....	....	....	....	....	2	..	2
Hill	4	1	3	..	2	....	1	....	1	....	....	....	....	....	2	2	..	6
Hillsborough	14	4	10	..	1	4	5	1	1	2	...	....	....	....	5	9	..	14
Hinsdale	4	....	4	..	..	1	....	1	....	....	....	1	....	1	2	2	..	5
Holderness	1	....	1	..	..	....	....	....	....	....	....	1	....	....	....	1	..	1
Hooksett	1	1	....	..	..	....	....	....	1	...	....	...	....	....	1	....	..	1
Hudson	5	1	4	..	..	....	1	...	2	1	....	1	....	....	1	4	..	5
Keene	85	14	71	..	3	14	20	16	10	10	5	2	2	3	40	45	..	99
Laconia	42	19	23	..	1	3	11	10	5	4	4	1	....	3	19	23	..	49
Lancaster	23	5	18	..	..	7	6	5	2	3	..	....	....	....	10	13	..	25
Lebanon	22	4	18	..	1	2	3	4	2	7	2	1	....	....	10	12	..	26
Lempster	6	3	3	..	..	....	2	2	....	1	1	....	....	...	5	1	..	6
Lisbon	4	....	4	..	..	1	....	2	....	1	....	....	....	....	1	3	..	4
Littleton	26	3	23	..	..	4	5	3	8	4	....	....	1	1	18	8	..	30
Londonderry	3	2	1	..	1	...	....	1	....	....	....	1	....	....	1	2	..	4
Lincoln	12	3	9	..	..	4	4	2	2	....	....	....	....	....	7	5	..	12
Lyme	4	1	3	..	..	....	....	1	1	....	1	1	....	....	1	3	..	5
Manchester	237	94	143	..	4	16	81	55	48	18	6	....	....	9	133	104	..	251
Marlow	1	....	....	1	..	...	....	....	1	...	....	....	...	....	1	....	..	1
Milford	6	1	5	..	..	....	1	2	2	....	....	....	1	....	3	3	..	7
Milton	1	....	1	..	..	1	....	....	...	....	....	....	....	....	1	....	..	1
Meriden	3	2	1	..	..	....	1	1	1	....	....	....	....	....	2	1	..	3
Meredith	3	2	1	..	..	...	2	....	1	....	....	...	....	....	2	....	1	3
Nashua	141	30	110	1	11	35	37	17	10	14	6	10	....	1	61	80	..	157

SPUTUM EXAMINATIONS FOR TUBERCULOSIS, 1907, 1908.—*Concluded.*

City or Town.	Number of cases examined.	Positive.	Negative.	Doubtful.	1 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	Age not stated.	Male.	Female.	Not stated.	Number of examinations.
New Boston	7	2	5	..	..	....	2	....	....	2	1	2	...	....	6	1	..	8
New Hampton	1	....	1	..	..	....	....	....	....	....	....	....	....	1	....	1	..	1
New London	4	....	4	..	..	...	2	....	1	....	1	....	....	....	....	4	..	4
Newmarket	2	1	1	..	..	....	....	....	....	2	....	...	...	....	1	1	..	2
Newport	10	3	9	..	..	1	4	2	3	....	1	1	....	....	6	6	..	12
Northwood	2	1	1	..	..	..	2	....	....	....	....	...	....	....	....	2	..	2
Nottingham	1	1	....	..	..	....	....	1	....	....	....	....	....	....	1	...	..	1
Orford	2	....	2	..	..	....	1	1	....	....	....	....	....	....	1	1	..	2
Ossipee	5	1	4	..	..	1	....	1	2	....	....	....	....	1	5	....	..	6
Peterborough	5	....	5	..	..	1	....	4	....	....	....	....	....	....	1	4	..	5
Pittsfield	19	8	11	..	1	1	7	7	2	1	....	....	....	....	10	9	..	19
Plaistow	2	1	1	..	..	1	....	....	1	....	....	....	....	....	1	1	..	3
Plymouth	27	7	20	..	..	1	3	3	3	4	1	2	...	....	16	11	..	30
Portsmouth	85	25	60	..	..	1	8	31	27	8	5	4	1	....	50	35	..	107
Rochester	20	9	11	..	..	....	4	3	....	5	2	....	1	....	6	14	..	21
Raymond	1	1	....	..	..	....	1	....	....	....	....	....	....	....	1	....	..	1
Sandwich	5	2	3	..	..	2	1	1	1	....	...	....	....	....	4	1	..	3
Seabrook	1	1	...	..	..	....	....	1	...	....	....	....	....	....	1	....	..	1
Somersworth	17	5	12	..	..	3	5	6	1	2	....	....	....	....	6	11	..	18
Stewartstown	10	2	3	..	..	3	2	2	2	1	....	....	....	....	6	4	..	12
Stratford	6	2	4	..	..	1	3	1	1	....	....	....	..	....	4	2	..	6
Sunapee	2	1	1	..	..	1	1	....	....	....	....	....	....	....	..	2	..	3
Suncook	29	5	24	..	1	3	6	3	4	3	1	1	1	1	22	7	..	32
Sutton	4	3	1	..	..	....	2	....	....	1	1	....	....	....	2	1	..	5
Swanzey	4	1	3	..	..	1	1	1	....	1	....	....	....	....	2	2	..	6
Tilton	11	3	3	..	..	1	2	1	3	1	1	....	1	1	6	5	..	11
Troy	4	1	3	..	..	....	....	...	2	2	....	....	...	....	3	1	..	7
Wakefield	1	1	....	..	..	....	1	....	....	...	....	....	....	....	....	1	..	1
Walpole	3	1	2	..	..	....	1	....	1	....	....	1	....	....	3	....	..	4
Warner	2	....	2	..	..	....	2	....	....	....	....	....	....	....	....	2	..	2
Warren	2	1	1	..	..	....	....	....	....	....	1	1	....	....	1	1	..	2
Winchester	2	....	2	..	..	....	....	....	....	....	....	2	....	....	....	2	..	2
Wilton	9	1	8	..	..	1	2	1	1	1	2	....	....	1	7	2	..	9
Whitefield	9	2	7	..	..	1	2	2	2	1	1	....	....	....	7	2	..	14
Wolfeboro	8	3	5	..	..	1	2	1	1	1	2	....	....	....	4	4	..	10
Woodsville	15	3	12	..	1	....	3	5	2	2	...	....	....	....	7	8	..	15
Residence not stated	15	3	12	..	..	....	3	7	2	1	....	1	....	1	9	6	..	15
Total	1914	559	1353	2	49	221	496	401	306	182	110	59	15	75	1018	870	26	2238

EXAMINATIONS FOR DIPHTHERIA, 1907, 1908.

City or Town.	Number of specimens sent.	Number sent for diagnosis.	Number sent for release from quarantine.	Number positive.	Number negative.
Alton	18	4	14	6	12
Alstead	4	3	1	2	2
Andover	17	10	7	7	10
Antrim	1	1	.....	.....	1
Ashland	13	5	8	2	11
Ashuelot	1	1	.....	.....	1
Barnstead	1	1	.....	.....	1
Bartlett	1	1	.....	.....	1
Belmont	4	4	.....	.....	4
Berlin	6	6	.....	.....	6
Bedford	6	6	.....	.....	6
Bradford	1	1	.....	1	.....
Bristol	4	4	.....	.....	4
Campton Village	1	1	.....	1	.....
Canaan	1	1	.....	1	.....
Candia	22	12	10	7	15
Canterbury	1	1	.....	.....	1
Centre Harbor	1	1	.....	.....	1
Charlestown	1	1	.....	.....	1
Chester	19	8	11	5	14
Claremont	17	17	.....	5	12
Concord	803	530	273	139	664
Contoocook	1	1	.....	.....	1
Conway	23	10	13	10	13
Derry	41	27	14	12	29
Dover	13	13	.....	4	9
Dublin	1	1	.....	.....	1
Effingham	5	1	4	1	4
Enfield	30	28	7	13	17
Epping	17	15	2	1	16
Exeter	26	18	8	6	20
Farmington	6	5	1	1	5
Fitzwilliam	1	1	.....	.....	1
Franconia	1	1	.....	.....	1

EXAMINATIONS FOR DIPHTHERIA, 1907, 1908.—*Continued.*

City or Town.	Number of specimens sent.	Number sent for diagnosis.	Number sent for release from quarantine.	Number positive.	Number negative.
Franklin	56	43	13	17	39
Gilmanton	13	11	2	2	11
Goffs Falls	4	2	2	2	2
Goffstown	38	20	18	11	27
Grasmere	10	6	4	3	7
Greenfield	1	1	.....	.....	1
Greenland	1	1	.....	.....	1
Hampstead	1	1	.....	.....	1
Hampton	2	2	.....	.....	2
Hanover	56	50	.....	.....	56
Haverhill	1	1	.....	.....	1
Henniker	3	3	.....	.....	3
Hillsborough	28	22	6	6	22
Hinsdale	27	21	6	7	20
Hookset	1	1	.....	.....	1
Hopkinton	4	3	1	3	1
Hudson	1	1	.....	.....	1
Keene	414	283	131	84	330
Laconia	104	64	40	29	75
Lancaster	4	4	.....	.....	4
Lebanon	53	47	6	5	48
Lisbon	7	6	1	2	5
Littleton	66	46	20	26	40
Londonderry	3	1	2	2	1
Louden	5	5	.....	.....	5
Lyme	3	3	.....	.....	3
Manchester	511	331	180	120	391
Marlborough	2	2	.....	.....	2
Meredith	3	3	.....	2	1
Mereden	14	7	7	2	12
Milford	147	63	84	20	127
Milton	2	1	1	1	1
Monroe	22	9	13	11	11
Nashua	*171	98	73	24	147

EXPERIMENTS FOR DIPHTHERIA, 1907, 1908.—*Concluded.*

City or Town.	Number of specimens sent.	Number sent for diagnosis.	Number sent for release from quarantine.	Number positive.	Number negative.
New Boston	*17	5	12	9	8
New London	*6	4	2	2	4
Newmarket	*2	2	.....	1	1
Newport	*7	7	.....	1	6
Orford	*2	2	.....	.....	2
Peterborough	80	37	43	30	50
Pittsfield	1	1	.....	.....	1
Plaistow	4	4	.....	.....	4
Plymouth	53	42	11	8	45
Portsmouth	53	50	3	14	39
Rochester	23	14	9	2	21
Rye	1	1	.....	.....	1
Salem Depot	2	2	.....	2	.....
Sandown	1	1	.....	.....	1
Somersworth	2	2	.....	.....	2
Springfield	18	1	17	1	17
Stewartstown	3	3	.....	1	2
Sunapee	2	2	.....	1	1
Suncook	17	11	6	1	16
Sutton	2	2	.....	1	1
Swanzey	6	6	.....	3	3
Tilton	2	2	.....	1	1
Walpole	12	12	.....	4	8
Warner	19	17	2	2	17
Warren	2	2	.....	2	.....
Whitefield	9	7	2	1	8
Wilton	7	7	.....	.....	7
Winchester	15	7	8	3	12
Wolfeboro	6	6	.....	1	5
Woodsville	86	63	23	19	67
Total	3,346	2,225	1,121	718	2,633
New Hampshire State Hospital	132	124	8	5	127
Grand total	3,478	2,349	1,129	718	2,760

EXAMINATIONS FOR TYPHOID FEVER, 1907, 1908.

City or Town.	Number of cases examined.	Positive.	Negative.	Doubtful.	1 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	Age not stated.	Male.	Female.	Not stated.
Alstead	2	1	1	..	..	....	....	1	1	....	....	....	....	....	1	1	....
Ashland	6	3	3	..	..	....	3	2	1	....	....	....	....	....	4	2	....
Ashuelot	2	1	1	..	..	1	....	1	....	....	....	....	....	....	1	1	....
Bartlett	1	....	1	..	..	1	....	....	....	...	....	....	....	....	1	....	....
Bedford	2	....	2	..	..	1	1	....	...	....	....	....	....	....	1	1	....
Belmont	1	....	1	..	..	1	....	...	...	....	....	....	....	....	1	....	....
Berlin	3	1	2	..	..	1	1	....	1	....	....	....	....	....	2	1	....
Bradford	1	....	1	..	..	....	....	....	....	....	....	....	....	1	....	1	....
Bristol	9	4	5	..	..	1	2	3	2	1	....	....	....	....	5	4	....
Bennington	2	....	2	..	..	....	1	....	1	....	....	....	....	....	1	1	....
Campton Village	3	....	3	..	..	1	1	1	....	....	....	....	...	....	1	2	....
Candia	1	....	1	..	..	1	....	....	....	....	....	....	....	....	....	1	....
Center Harbor	2	1	1	..	..	....	....	....	2	...	....	....	....	....	1	1	....
Centerville	1	....	1	..	..	1	....	...	....	....	....	....	....	....	1	...	....
Charlestown	3	1	2	..	..	1	2	....	...	....	....	....	....	....	3	....	....
Claremont	37	10	27	..	7	4	17	9	....	...	....	...	....	....	25	12	...
Concord	107	23	84	..	5	24	34	21	16	6	1	....	....	....	53	54	....
Conway	7	1	6	..	..	3	2	1	1	....	....	....	....	....	4	3	....
Derry	7	3	4	..	..	....	3	3	1	....	....	....	....	....	4	3	...
Dover	5	2	3	..	..	....	2	2	1	....	....	...	....	....	3	2	....
Epsom	2	1	1	..	..	....	1	1	....	....	....	....	....	....	1	1	.. .
Exeter	18	4	14	..	2	5	4	2	2	3	....	....	....	....	10	8	....
Farmington	5	2	3	..	..	2	3	....	...	...	....	....	....	....	1	4	....
Franklin	17	4	13	..	1	....	8	6	2	....	..	....	....	....	14	3	....
Gilmanton	2	2	....	..	..	1	....	1	....	....	....	....	....	....	1	1	....
Goffstown	1	....	1	..	..	....	1	...	....	....	...	....	....	....	....	1	....
Greenland	2	2	....	..	..	2	...	....	....	....	....	....	....	....	1	1	...
Greenville	1	....	....	1	1	....	....	....	....	..	....	....	....	....	....	1	....
Hampton	3	....	3	..	1	....	1	....	....	....	1	....	....	....	3	....	....
Hanover	9	2	7	..	..	2	7	....	....	....	....	....	....	....	7	2	....
Henniker	4	1	3	..	..	....	3	1	....	....	....	....	....	....	3	1	....
Hillsborough	11	3	8	..	1	1	3	3	1	2	....	....	....	....	8	3	....
Hinsdale	5	4	1	..	..	...	5	1	....	....	....	....	....	....	....	5	....
Keene	31	5	26	..	1	10	9	8	1	1	1	....	....	....	9	22	....

EXAMINATIONS FOR TYPHOID, 1907, 1908.—*Concluded.*

City or Town.	Number of cases examined.	Positive.	Negative.	Doubtful.	1 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	Age not stated.	Male.	Female.	Not stated.
Laconia	5	1	4	..	..	1	2	....	2	....	....	....	....	....	3	2	...
Lebanon	11	2	9	..	..	4	1	2	1	3	....	....	....	....	8	3	...
Lisbon	23	18	5	..	..	3	5	6	7	2	....	....	....	....	16	7	..
Littleton	7	3	4	..	1	1	4	1	....	....	...	....	....	....	4	3	..
Manchester	47	17	30	..	6	9	18	5	5	....	....	....	....	4	33	14	..
Milford	2	2	....	..	1	1	....	....	....	....	...	....	....	....	1	1	..
Milton	1	1	....	..	..	....	...	1	....	....	....	....	....	....	1	....	...
Nashua	36	10	26	..	2	8	16	4	3	2	1	....	....	....	21	15	....
Northwood Road	1	....	1	..	..	....	....	1	....	....	....	....	....	....	....	1	...
Orford	3	1	1	1	..	....	....	3	....	....	....	....	..	....	2	1	....
Pembroke	1	1	....	..	..	....	....	1	....	....	....	....	....	....	....	1	....
Peterborough	2	....	2	..	..	....	2	....	....	....	....	....	....	....	2	....	....
Portsmouth	22	7	15	..	2	6	6	3	4	....	1	....	....	....	15	7	....
Plymouth	11	5	6	..	3	3	3	....	1	1	....	....	....	....	11	....	....
Rochester	3	1	2	..	..	1	1	....	....	....	....	1	....	....	3	....	....
Stewartstown	2	1	1	..	..	....	1	....	1	....	....	....	....	....	2	....	....
Suncook	2	....	1	1	1	....	....	....	1	....	....	....	....	....	....	2	....
Sutton	4	....	4	..	2	2	....	....	....	...	....	....	....	....	3	1	....
Swanzey	2	....	2	..	..	....	....	....	....	....	....	....	....	2	....	2	....
Tamworth	1	....	1	..	..	....	....	....	....	....	....	....	....	1	1	....	....
Walpole	8	3	5	..	..	1	3	2	...	2	....	....	....	....	8	....	....
Warner	5	....	5	..	..	....	3	1	1	....	....	....	....	....	3	2	....
Whitefield	1	1	....	..	..	1	....	....	....	....	....	....	....	....	1	....	....
Wilton	1	....	1	..	..	....	....	1	....	....	....	....	....	....	....	1	....
Winchester	4	....	4	..	..	....	1	2	1	....	....	....	....	....	3	1	....
Woodsville	1	....	1	..	..	....	1	....	....	....	....	....	....	....	1	....	....
Total	519	155	361	3	37	105	181	100	60	23	5	1	....	7	312	207	....

EXAMINATIONS FOR MALARIA.

Year.	Number of Examinations.	Positive.	Negative.
1906-1907.....	18	....	18

EXAMINATIONS FOR GONOCOCCI.

Year.	Number of Examinations.	Positive.	Negative.
1906-1907.....	45	23	22

MISCELLANEOUS EXAMINATIONS.

Pus for streptococci 12; positive 3; negative 9.
Tissue for tuberculosis 10; positive 6; negative 4.
Fæces for tuberculosis 6; negative 5 positive 1.

BOARDS OF HEALTH OF NEW HAMPSHIRE.

BOARDS OF HEALTH OF THE STATE OF NEW HAMPSHIRE.

Town.	Names.	Post-office address.	Date of Appointment.
Acworth.	George W. Buss,	East Acworth,	Aug. 4, 1906
	Dr. E. G. Dearborn,	South Acworth,	April 27, 1907
Albany.			
Alexandria.	A. F. Cheney, Sec.,	Bristol, R. F. D. No. 1,	May 13, 1908
	C. L. Plumer,	Alexandria,	May 13, 1908
	E. W. Tucker,	Alexandria,	Oct. 2, 1907
Allenstown.	Dr. A. M. Lavallee, Sec.,	Suncook,	March 13, 1907
	Felix Conner,	Suncook,	March 13, 1907
	Charles H. Smith,	Suncook,	March 13, 1908
Alstead.	Dr. R. F. Oliver,	Alstead,	Dec. 3, 1907
	John F. Kemp,	East Alstead,	Dec. 3, 1907
	Frank Dewing,	Alstead Center,	April 18, 1908
Alton.	Frank M. Ayer,	Alton,	April 27, 1906
	Charles E. Hutchins, Sec.,	Alton,	March 30, 1907
	Charles E. Fifield,	Alton,	April 4, 1908
Amherst.	Frank C. Taylor, Sec.,	Amherst,	May 4, 1907
	Lindley F. Wyman,	Amherst,	May 7, 1907
	Enos S. Robinson,	Amherst,	May 4, 1907
Andover.	Wilton P. Graves,	East Andover,	April 26, 1902
	Dr. H. A. Weymouth, Sec.,	Andover,	April 25, 1908
	Dr. E. C. Durgin,	East Andover,	May 2, 1908
Antrim.	Dr. F. C. Warner, Sec.,	Antrim,	April 23, 1906
	Oscar W. Brownell,	Antrim,	
	Arthur B. Crombie,	Antrim,	October, 1908
Ashland.	Ora A. Brown, Sec.,	Ashland,	May 8, 1905
	Dr. J. M. Cheney,	Ashland,	April 25, 1905
	Edward P. Warner,	Ashland,	March 22, 1904
Atkinson.	S. B. Maron,	Atkinson,	March 23, 1908
	George A. Sawyer,	Atkinson Depot,	March 20, 1907
	George P. Dow, Sec.,	Atkinson,	March 22, 1906
Auburn.	John P. Griffin, Sec.,	Auburn,	May 8, 1906
	Lewis G. Shattuck,	Auburn,	May 1, 1907
	Benjamin Eaton,	Auburn,	June 1, 1908
Barnstead.	John D. Nutter, Sec.,	Center Barnstead,	June 1, 1906
	Enos George,	Barnstead,	June 1, 1907
Barrington.	A. B. Locke, Sec.,	Barrington,	April 20, 1907
	John H. Morrison,	West Barrington,	April 20, 1907
	George O. A. Chesley,	Barrington,	May 11, 1907
Bartlett.	M. W. Pierce,	Glen,	April 4, 1908
	E. A. Stevens,	Bartlett,	April 4, 1908
	S. S. Mullin,	Bartlett,	Aug. 8, 1908
Bath.	Samuel M. Chamberlin,	Woodsville,	April 19, 1906
	Albert H. Clough, Sec.,	Bath,	March 28, 1907
	Dr. John H. DeGross,	Bath,	Dec. 28, 1907
Bedford.	Dr. E. A. Jones, Sec.,	Bedford,	April 1, 1908
	Charles P. Woodbury,	Bedford,	April 1, 1908
	Lyman M. Kinson,	Bedford,	April 1, 1908
Belmont.	W. H. H. Chaplain, Sec.,	Belmont,	Sept. 10, 1906
	C. W. Johnson,	Belmont,	April 30, 1907

Bennington.	Allen Gessard,	Bennington,	May 10, 1905
	Arthur F Bell	Bennington,	March 31, 1906
	W B. Russell,	Bennington,	March 18, 1907
Benton.	S. J Hutchins, Sec.,	Benton,	Nov. 6, 1906
	George H. Clark,	Woodsville, R. F. D. No. 2,	March 27, 1907
	E. A. Marden,	Benton,	March 27, 1908
Berlin.	Dr. A. Lavallee,	Berlin,	April 1, 1908
	H. D. Shea, Sec.,	Berlin,	April 1, 1908
	H. J. Johnson,	Berlin Mills,	April 1, 1908
Bethlehem.	Dr. H. E. Thompson,	Bethlehem,	March 21, 1908
	Dr. H. A. Hildreth,	Bethlehem,	April 11, 1907
	W. H. Presby, Sec.,	Bethlehem,	April 9, 1906
Boscawen.	Dr. A. C. Alexander,	Penacook,	April 2, 1906
	W. H. Buxton,	Penacook,	Sept. 28, 1906
	Dr. E. E. Graves, Sec.,	Penacook,	March 21, 1908
Bow.	John P. Elliott,	Concord, R. F. D. No. 3,	March 21, 1908
	Byron W Clough,	Concord, R. F. D. No. 3,	May 29, 1908
Bradford.	Charles Gillis,	Bradford,	June 1, 1907
	D. G. Underwood,	Bradford,	April 25, 1905
Brentwood.	Ezra B. Pike, Sec.,	Exeter, R. F. D.	April 3, 1908
Bridgewater.	John H. Morrison,	Plymouth, R. F. D. No. 2,	April 21, 1908
Bristol.	Charles W. Fling, Sec.,	Bristol,	1905
	C. A. Smith,	Bristol,	1906
	D. M. Calley,	Bristol,	1907
Brookfield.	Charles Willey	Sanbornville, R. F. D. No. 1,	April, 1908
	Jasper T Palmer	Sanbornville, R. F. D. No. 1,	May, 1905
	John F Robinson, Sec.,	Sanbornville, R. F. D. No. 1,	April, 1908
Brookline.	Charles H. Russell,	Brookline,	March, 1906
	Dr. H. C. Holcombe, Sec.,	Brookline,	March, 1907
	Frank H. Jenness,	Brookline,	March, 1908
Campton.	Samuel P. Robie,	Campton Village,	May 9, 1908
	H. M. Fifield,	Campton Village,	May 19, 1908
Canaan.	Frank Clarke,	Canaan,	
	Herbert L. Webster,	West Canaan,	
	George W. Chase, Sec.,	Canaan Center,	
Candia.	Edwin J. Godfrey,	Candia, R. F. D. No. 1,	May 1, 1906
	Avery M. Foster, Sec.,	Candia, R. F. D. No. 1,	April 15, 1908
	J. Lane Fitts,	Manchester, R. F. D. No. 1,	April 15, 1908
Canterbury.	Albert F. Drew, Sec.,	Canterbury,	March 16, 1907
	George M. Fletcher,	Canterbury,	April 4, 1908
Carroll.	John H. Glines,	Twin Mountain,	1904
	R. J Quinn,	Twin Mountain,	1904
Center Harbor.	Frank R. Gammon,	Center Harbor,	March 20, 1908
	L. B. Morrill, Sec.,	Center Harbor,	March 20, 1908
Charlestown.	Oscar C. Young, Sec.,	Charlestown,	April 1, 1907
	Wesley A. Hunt,	North Charlestown,	April 1, 1907
	H M. Stearns,	Charlestown,	April 1, 1907
Chatham.	James M. Weeks,	Green Hill,	1908
	Charles H. Binford, Sec.,	Chatham,	1907
	Madison O. Charles,	North Chatham,	1906
Chester.	Walter I. Martin,	Chester,	April 14, 1906
	Cyrus F Marston, Sec.,	Chester,	April 19, 1907
	William T. Owen,	Chester,	May 21, 1908
Chesterfield.	John W. Work, Sec.,	Spofford,	March 27, 1905
	Wallace W. Ware,	Chesterfield,	March 20, 1906
	Fred W. Streeter,	West Chesterfield,	March 16, 1907
Chichester.	J. L. T. Shaw, Sec.,	Chichester,	April 30, 1905
	Clarence W. Edmunds,	Chichester,	May 30, 1908
Claremont.	Dr. A. L. Marden, Sec.,	Claremont,	March 12, 1907
	George A. Rowell,	Claremont,	March 12, 1907
	Rufus L. Howe,	Claremont,	March 12, 1907

Colebrook.	Dr. Edwin A. Cook, Sec.,	Colebrook,	March 12, 1908
	Edward E. Twombly,	Colebrook,	March 12, 1908
	D. S. Pease,	Colebrook,	March 12, 1908
Columbia.	William E. Cone, Sec.,	Cöös,	May 18, 1906
	U. S. Grant Holden,	Colebrook,	April 17, 1908
	Charles E. Martin,	Colebrook,	
Clarksville.	Charles Knights,	Pittsburg,	March 13, 1906
	Moses A. Hardy,	Clarksville,	March 12, 1907
	Noah F. Kidder,	Clarksville,	March 10, 1907
Concord.	Charles R. Corning, Mayor, *ex officio*,	Concord,	Jan. 22, 1907
	Dr. Charles H. Cook, City Physician, *ex officio*, Sec.,	Concord,	Jan. 22, 1907
	Dr. George Cook,	Concord,	Jan. 22, 1907
Conway.	Dr. George H. Shedd,	North Conway,	April, 1906
	Dr. B. Frank Horn,	Conway,	April, 1907
	W. R. Burnell, Sec.,	Conway Center,	April, 1908
Cornish.	(Selectmen have been unable to fill the office. No one will serve.)		
Croydon.	Fred W. Putnam, Sec.,	Croydon,	May 30, 1905
	Charles H. Forehand,	Croydon,	April 26, 1906
	S. W. Gilman,	Croydon,	April 18, 1907
Dalton.	Elmer P. Kelso, Sec.,	Whitefield, R. F. D. No. 2,	March, 1907
	W. H. Cushman,	Littleton, R. F. D. No. 1,	March, 1908
	W. B. Aldrich,	Lancaster, R. F. D. No. 2,	March, 1908
Danbury.	Dr. Lee V. Knapp, Sec.,	Danbury,	April 17, 1906
	Willis W. Walker,	South Danbury,	July 2, 1906
	Arthur R. Ford,	Danbury,	April 20, 1907
Danville.	Freeman W. Tuck,	North Danville,	March 13, 1906
	William P. Kimball,	South Danville,	March 12, 1907
	Elmer A. Kimball,	South Danville,	Jan. 8, 1908
Deerfield.	Dr. G. H. Towle,	Raymond, R. F. D.	Sept. 27, 1906
	J. H. Prescott, Sec.,	Deerfield Center,	April 25, 1906
	G. W. Brown,	Deerfield,	Aug. 18, 1908
Deering.	Arthur O. Ellsworth, Sec.,		April 10, 1907
	Charles E. Brown,	Deering,	April 10, 1907
	Charles T. McNally,	Deering,	March 28, 1908
Derry.	Charles H. Nickerson,	Derry,	1907
	William E. Eaton,	Derry,	1906
	Dr. Walter R. Sanders, Sec.,	Derry Village,	1908
Dorchester.	Bertram C. Putney, Sec.,	Dorchester,	March 12, 1908
	Hazen H. Clough,	North Dorchester,	March 12, 1907
	Clarence P. Waldron,	Cheever,	March 23, 1906
Dover.	Dr. Stephen Young, City Physician, *ex officio*,	Dover,	Jan. 1, 1908
	J. B. Adams, City Marshal, *ex officio*,	Dover,	Dec. 17, 1907
	Charles M. Jones, Executive Officer,	Dover,	Feb. 6, 1908
Dublin.	Clifford Gowing, Sec.,	Dublin,	April 2, 1906
	Willard H. Pierce,	Dublin,	March 30, 1907
	Clesson E. Gowing,	Dublin,	March 30, 1908
Dummer.	James G. Hamlin, Sec.,	Milan,	Aug. 5, 1908
	Daniel R. Wight,	Milan,	Aug. 5, 1908
	Ernest P. Gaud,	Milan,	Aug. 5, 1908
Dunbarton.	Horace Caldwell (deceased)	Dunbarton,	March 13, 1906
	Daniel F. Heath,	Concord, R. F. D. No. 2,	March 12, 1908
	Charles Gourley,	Dunbarton,	March 10, 1908
Durham.	Dr. Albert E. Grant,	Durham,	April 20, 1904
	Lucien Thompson, Sec.,	Durham,	Nov. 24, 1906
	Fred W. Taylor,	Durham,	March 28, 1908
East Kingston.			

Easton.	J. R. Noyes,	Easton,	March 10, 1908
	W. H. Judd,	Easton,	March 10, 1908
Eaton.	Clement Drew, Sec.,	Eaton,	May 26, 1906
	Winfield S. Head,	Snowville,	March 31, 1908
	Oren N. Currier,	Freedom, R. F. D.	April 23, 1908
Effingham.	James M. Leavitt, Sec.,	Effingham,	April 20, 1904
	John L. Deneritt,	Effingham Falls,	April 15, 1905
	Horace W. Harmon,	Effingham,	April 24, 1907
Ellsworth.	Warren P. Buzzell, Sec.,	Ellsworth,	March 13, 1906
	Charles H. Willey,	Ellsworth,	March 12, 1907
	Wilber B. Avery,	Ellsworth,	March 10, 1908
Enfield.	Simon Ward,	Enfield,	May 26, 1906
	Franklin P. Fisher,	Enfield Center,	May 6, 1907
	George W. Dustin, Sec.,	Enfield,	August 1, 1908
Epping.	Dr. A. C. Buswell,	Epping,	1906
	J. O. Ross, Sec.,	Epping,	1907
	Augustus Brown,	Epping,	1908
Epsom.	Dr. Roscoe Hill, Sec.,	Epsom,	April 7, 1900
	Josiah C. Lear,	Short Falls,	April 7, 1900
	Charles W. Leighton,	Gossville,	March 28, 1908
Errol.	N. R. Leach,	Errol,	Dec. 6, 1906
	H. S. Thurston,	Errol,	
	A. A. Jenkins,	Errol,	
Exeter.	Arthur S. French,	Exeter,	March 31, 1906
	Dr. William H. Nute, Sec.,	Exeter,	April 1, 1907
	Frank O. Tilton,	Exeter,	April 1, 1908
Farmington.	Forrest B. Wedgwood, Sec.	Farmington,	
	George V. Card,	Farmington,	
	Chester C. Ricker,	Farmington,	
Fitzwilliam.	Arthur T. Byam,	Fitzwilliam,	April 10, 1906
	Dr. George S. Emerson,	Fitzwilliam,	May 7, 1907
Francestown.	James T. Woodbury, Sec.,	Francestown,	May 7, 1906
	Martin L. Colburn,	Francestown,	March 11, 1908
	Dr. Edwin D. Stevens,	Francestown,	March 20, 1908
Franconia.	G. H. Burt.	Franconia,	March 18, 1906
	Dr. H. L. Johnson, Sec.,	Franconia,	March 19, 1908
	W. H. Brooks,	Franconia,	March 18, 1908
Franklin.	Dr. Charles W. Adams, Sec.,	Franklin,	Jan. 6, 1908
	Frank H. Daniell,	Franklin,	Jan. 6, 1908
	Harry W. Gilchrist,	Franklin,	Jan. 6, 1908
Freedom.	Dr. Geo. W. Lougee, Sec.,	Freedom,	April 14, 1906
	Manson, B. Godfrey,	Freedom,	April 9, 1907
	George C. Leavitt,	Effingham Falls,	April 30, 1908
Fremont.	Dr. Ernest W. Lowe, Sec.,	Fremont,	March 17, 1906
	Harrison B. Ellis,	Fremont,	April 3, 1907
	Joseph B. Sanborn,	Fremont,	April 3, 1908
Gilford.	J. Earl Sanborn,	Lakeport, R. F. D. No. 1,	March 17, 1906
	Charles E. Curtis,	Lakeport, R. F. D. No. 1,	May 25, 1907
	Otis S. Roberts,	Lakeport, R. F. D. No. 1,	April 24, 1908
Gilmanton.	Harlan Page, Sec.,	Gilmanton Iron Works,	March 17, 1906
	George F. Kelley,	Pittsfield,	March 17, 1906
	Dr. N. W. McMurphy,	Gilmanton,	May 30, 1908
Gilsum.	Dr. I. A. Loveland,	Gilsum,	April 5, 1907
	J. H. Laing,	Gilsum,	May 21, 1906
	Allen Hayward,	Gilsum,	August 3, 1908
Goffstown.	Dr. Maurice Stark, Sec.,	Goffstown,	March 17, 1906
	Dr. E. B. Swett,	Grasmere,	April 15, 1907
	Henry H. Stark,	Goffstown,	April 20, 1908
Gorham.	Thomas Wight,	Gorham,	March 24, 1906
	Dr. Henry Marble, Sec.,	Gorham,	April 13, 1908
	Pascal M. Morgan,	Gorham,	May 4, 1908

Goshen.	Dr. Fred P. Jones, Sec.,	Mill Village,	March 27, 1906
	Hobart B. Russell,	Mill Village,	May 4, 1907
	George B. Bartlett,	Mill Village,	April 20, 1908
Grafton.	Joseph E. Walker, Sec.,	Grafton,	April 30, 1908
	John A. Jones,	Grafton,	May 1, 1908
	Fred Gage,	Grafton,	April 30, 1908
Grantham.	Perley Walker, Sec.,	Grantham,	1906
	Paul D. Lovering,	Newport,	1907
Greenfield.	Dr. N. F. Cheever, Sec.,	Greenfield,	1907
	John K. Felch,	Greenfield,	May 11, 1908
	William Webster, Jr.,	Greenfield,	May 23, 1908
Greenland.	John P. Weeks, Sec.,	Greenland,	March, 1907
	William A. Adell,	Greenland,	March, 1907
Greenville.	Henry S. Farrar,	Greenville,	March 24, 1906
	Henry I. Whitney,	Greenville,	March 15, 1907
	Dr. Byron D. Pease, Sec.,	Greenville,	March 21, 1908
Groton.			
Hampstead.	Daniel Emerson,	Hampstead,	March 31, 1906
	Walter A. Allen, Sec.,	East Hampstead,	Feb. 18, 1908
	W. Amos Fitts,	Hampstead,	March 14, 1908
Hampton.	George E. Garland, Sec.,	Hampton,	April 28, 1907
	Dr. Stanley M. Ward,	Hampton,	March 27, 1908
	William T. Ross,	Hampton, No. 19,	March 27, 1908
Hampton Falls.	J. Edward Brown, Sec.,	Hampton Falls,	1906
	Arthur W. Chase,	Hampton Falls,	1907
	John N. Sanborn,	Hampton Falls,	1908
Hancock.	A. B. Stone,	Hancock,	March 31, 1906
	C. H. Dutton,	Bennington,	May 3, 1907
	W. M. Davis, Sec.,	Hancock,	April 24, 1908
Hanover.	Dr. John M. Gile, Sec.,	Hanover,	May 2, 1908
	Willie G. Spencer,	Etna,	May 2, 1908
	B. C. Church,	Etna,	May 2, 1908
Hanover Precinct.	John V. Hazen,	Hanover,	
	Perley R. Bugbee,	Hanover,	
	Elmer T. Ford,	Hanover,	
Harrisville.	Bernard F. Bemis, Sec.,	Chesham,	Sept. 5, 1903
	Charles P. Hayward,	East Harrisville,	May 3, 1907
	Fred A. Stratton,	Harrisville,	May 3, 1907
Hart's Location.	Joseph Monahan,	Mount Carrigan,	March, 1908
	C. H. Morey,	Bemis,	March, 1908
	R. B. Chase, Sec.,	Bemis,	March, 1908
Haverhill.	Dr. Geo. W. Hazelton, Sec.,	Haverhill,	May 2, 1908
	Ezra B. Willoughby,	North Haverhill,	May 2, 1908
	Pardon W. Allen,	Pike,	May 2, 1908
Hebron.	Fred B. Huckins, Sec.,	Hebron,	March, 1906
	Albert E. Moore,	Hebron,	March, 1907
	Frederick Clement,	Hebron,	March, 1908
Henniker.	Dr. George H. Sanborn,	Henniker,	May, 1906
	Edgar M. Clough, Sec.,	Henniker,	April 1, 1907
	Harry W. Balch,	Henniker,	June, 1908
Hill.	A. A. Bartlett,	Hill, R. F. D.,	April 1, 1904
	V. S. Straw,	Hill,	Sept. 15, 1906
	Jean M. Shaw, Sec.,	Hill,	May 9, 1908
Hillsborough.	Dr. Warren P. Grimes, Sec.,	Hillsborough,	April 4, 1903
	Leon E. Annis,	Hillsborough,	April 18, 1903
	Dr. John Goodell,	Hillsborough Lower Village,	June 4, 1904
Hinsdale.	F. S. Leonard,	Hinsdale,	Sept. 22, 1905
Holderness.	Dr. John H. Evans,	Plymouth. R. F. D. No. 4,	1906
	Lawrence J. Webster, Sec.,	Holderness,	1907
	John H. Perkins,	Holderness,	1908

Hollis.	George S. Hazard, M. D.,	Hollis,	
	Samuel F. Wood,	Hollis,	
	Charles E. Hardy,	Hollis,	
Hooksett.	Dr. Theodore M. Togus, Sec.,	Hooksett,	April 2, 1903
	S. E. Worthley,	Hooksett,	July 3, 1905
	Frank A. Thomas,	Manchester, R. F. D. No. 9,	April 12, 1902
Hopkinton.	William C. Russ,	Hopkinton,	May 17, 1906
	Dr. Geo. C. Blaisdell, Sec.,	Contoocook,	March 12, 1907
	Frank I. Morrill,	Contoocook,	March 17, 1908
Hudson.	Dr. Henry O. Smith,	Hudson Center,	May 20, 1906
	Clarence E. Walch, Sec.,	Hudson, R. F. D. No. 2,	April 1, 1907
	James E. Merrill,	Hudson,	May 8, 1908
Jackson.	Frank H. Wilson,	Jackson,	April 3, 1901
	Willis B. Hodge,	Jackson,	April 29, 1902
	Andrew C. Harriman, Sec.,	Jackson,	May 2, 1903
Jaffrey.	William F. Coolidge,	East Jaffrey,	March 16, 1907
	Dr. Fred'k C. Sweeney, Sec.,	East Jaffrey,	March 11, 1906
Jefferson.	Frank O. Glidden, Sec.,	Jefferson,	1906
	L. Arthur Davis,	Jefferson,	1907
	Dr. L. C. Aldrich,	Jefferson,	1908
Keene.	Charles G. Shedd,	Keene,	January, 1906
	L'd Wellington, Esq. Sec.,	Keene,	1907
	Dr. Frank D. Worcester,	Keene,	1908
Kensington,	Edward J. Blodgett, Sec.,	Kensington,	May, 1907
	Frank A. Batchelder,	Kensington,	May, 1907
	David Brown,	East Kingston, R. F. D.,	May, 1908
Kingston.	Dr. C. P. F. Joyce, Sec.,	Kingston,	March 14, 1908
	Will L. Hilliard,	Exeter,	March 16, 1907
	George M. Baker,	Kingston,	March 17, 1906
Laconia.	Dr. J. A. Wrisley,	Lakeport,	March, 1908
	Dr. Walter H. True, Sec.,	Laconia,	March, 1906
	Fred E. Moore,	The Weirs,	March, 1907
Lancaster.	Harry B. Carpenter,	Lancaster,	March, 1906
	Jared I. Williams,	Lancaster,	March, 1907
	Dr. Frank Spooner,	Lancaster,	March, 1908
Landaff.	G. H. Young,	Lisbon, R. F. D. No. 2,	May 31, 1905
	O. S. Merrill,	Lisbon, R. F. D. No. 2,	April 13, 1904
	Charles S. Chandler,	Lisbon, R. F. D. No. 2,	May 10, 1907
Langdon.	John W. Jeft,	Langdon,	May 4, 1906
	Charles A. Jeft,	Drewsville,	April 1, 1905
Lebanon.	Clarence E. Hibbard,	Lebanon,	June 25, 1906
	Milton S. Woodman,	West Lebanon,	March 29, 1907
	Dr. Frederic Von Tobel, Sec.,	Lebanon,	March 31, 1908
Lee.	John C. Bartlett, Sec.,	Newmarket, R. F. D.	
	Wm. S. Caldwell,	Dover, R. F. D. No. 5,	
Lempster.	George W. Hurd,	Lempster,	May 11, 1906
	Loren A. Noyes, Sec.,	East Lempster,	April 15, 1908
	Frank W. Huntoon,	Lempster,	August 1, 1908
Lincoln.	Dr. E. D. Burke, Sec.,	Lincoln,	July 20, 1908
	H. A. Chamberlin,	Lincoln,	July 20, 1908
	John H. Henry,	Lincoln,	July 20, 1908
Lisbon.	Dr. Franklin E. Spear, Sec.,	Lisbon,	April 4, 1908
	Oren Clough,	Lisbon,	April 4, 1908
Lisbon Village.	A. A. Woolson,	Lisbon,	March 30, 1908
	W. H. Merrill,	Lisbon,	March 30, 1908
	A. G. Moulton,	Lisbon,	March 30, 1908
Litchfield.	James Hapwood,	Hudson, R. F. D. No. 1,	April 25, 1902
	Clinton E. Leach, Sec.,	Manchester, R. F. D. No. 5,	February 20, 1904
Littleton.	George W. Smith, Sec.,	Littleton,	March 15, 1906
	Dr. C. M. Sneden,	Littleton,	March 20, 1907
	Harry L. Heald, Esq.,	Littleton,	March 14, 1908

Livermore.	John H. Garland,	Livermore,	March 10, 1908
	George S. Payne, Sec.,	Livermore,	March 10, 1908
Londonderry.	Samuel P. Robie	Derry, R. F. D. No. 1,	April 3, 1907
	William Richardson,	Londonderry,	June 12, 1907
	Fred E. Annis,	Londonderry,	May 14, 1908
Loudon.	Edwin H. Sleeper,	Loudon, R. F. D. No. 6,	October 20, 1906
	Samuel M. True,	Loudon, R. F. D. No. 10,	October 14, 1904
Lyman.	A. J. Astle, Sec.,	Lisbon, R. F. D, No. 1,	May 30, 1908
	A. W. Hubbard,	Lisbon, R. F. D. No. 3,	May 6, 1907
	Ephraim Corey,	Lisbon, R. F. D. No. 3,	April 30, 1908
Lyme.	Payson E. Fairfield,	Lyme,	April 13, 1906
	Henry W. Abbott,	Lyme,	April 13, 1907
	Dr. George W. Weymouth,	Lyme,	July 31, 1908
Lyndeborough.	George T. Hutchinson,	Wilton,	April 28, 1906
	Jacob A. Woodward,	So. Lyndeborough,	April 6, 1907
	Charles H. Tarbell,	So. Lyndeborough,	April 9, 1908
Madbury.	Frank J. Bemis,	Madbury,	May, 1907
	Arthur W. Simpson,	Dover,	May, 1907
	Lewis H. Young, Sec.,	Dover,	May, 1908
Madison.	Dr. W. G. Martin, Sec.,	Madison,	August 10, 1906
	Eugene E. Alley,	Madison,	August 10, 1908
	Holland C. Harriman,	Madison,	August 10, 1908
Manchester.	Dr. Joseph E. A. Lanouette,	Manchester,	January, 1906
	William K. Robbins, Sec.,	Manchester,	January, 1907
	William J. Starr,	Manchester,	January, 1908
Marlborough.	Dr. W. H. Aldrich, Sec.,	Marlborough,	September 27, 1907
	E. P. Richardson,	Marlborough,	September 10, 1907
Marlow.	Harlan E. Hony, Sec.,	Marlow,	March 19, 1906
	Caleb H. Perkins,	Marlow,	March 29, 1908
	Arthur M. Davis,	Marlow,	March 28, 1908
Mason.	John T. Smith,	Mason,	March 20, 1904
	Charles B. Goodwin, Sec.,	Mason,	March 1, 1905
	Winfred Whitaker,	Mason,	March 15, 1905
Meredith.	Dr. Newell C. Nutting, Sec.,	Meredith,	July 20, 1906
	Frank A. Shaw,	Meredith,	March 28, 1908
	Edmund Page,	Meredith,	May 23, 1908
Merrimack.	Anson A. Platts,	Reed's Ferry,	December 15, 1906
	Frank P. Jones, Sec.,	Merrimack,	December 15, 1906
	Dr. Guy H. Greeley,	Thornton's Ferry,	December 15, 1906
Middleton.	Meander H. Davis,	Middleton,	January 28, 1907
	Frederick A. Orne,	Middleton,	May 4, 1907
	George E. Emery,	Union,	May 9, 1908
Milan.	Dr. Homer H. Marks,	Milan,	January 8, 1908
	Freeman H. Sweetser,	Milan,	May 25, 1908
Milford.	Dr. W. H. W. Hinds, Sec.,	Milford,	March 25, 1907
	Dr. Eugene Wason,	Milford,	March 28, 1906
	B. F. Foster,	Milford,	August 1, 1908
Milton.	Dr. M. A. H. Hart, Sec.,	Milton,	March 11, 1907
	Elbridge Fox,	Milton Mills,	May 4, 1908
	Harry D. Coles,	Milton,	May 4, 1908
Monroe.	W. H. Hinman, Sec.,	Monroe,	March 12, 1907
	O. H. Schoff,	Monroe,	March 10, 1908
	Homer E. Smith,	North Monroe,	March 10, 1908
Mont Vernon.	Jay A. Gleason,	Mont Vernon,	1908
	Dr. J. M. Thompson,	Mont Vernon,	1907
	John M. Fox,	Mont Vernon,	1906
Moultonborough.	Frank S. Lovering, M. D.,	Moultonborough,	
	George H. Richardson,	Moultonborough,	
	Henry P. Gould,	Center Harbor,	
Nashua.	Dr. J. A. Lagace, Sec.,	Nashua,	January 1, 1908
	Walter B. Chase,	Nashua,	January 1, 1908
	John J. Seavey,	Nashua,	January 1, 1908

Nelson.	George W. Osgood,	Nelson,	April 11, 1906
	Frank E. Foster,	Munsonville,	June 22, 1908
	William S. Mansfield,	Munsonville,	June 22, 1908
New Boston.	Dr Charles A. Weaver,	New Boston,	March 28, 1908
	Charles F. Marden, Sec.,	New Boston,	May 11, 1907
Newbury.	George H. Whedon,	South Newbury,	March 12, 1907
	Thomas J. Leach, Sec.,	Newbury,	July 15, 1907
	George J. Messer,	Newbury,	April 4, 1908
Newcastle,	Conrad Push, Sec.,	Newcastle,	May 28, 1908
	Edward B Baker,	Newcastle,	May 28, 1908
	Robert H. Harding,	Mewcastle,	May 28, 1908
New Durham.	Edwin R. Young,	New Durham,	April 4, 1906
	William R. Webster,	New Durham,	April 27, 1907
Newfields.	Samuel Neal,	Newfields,	March 16, 1908
	Christopher E. Pollard,	Newfields,	March 16, 1908
	Dr. Albert H. Varney, Sec.,	Newfields,	May 30, 1908
New Hampton.	Dr. A. S. Dolloff,	New Hampton,	April, 1907
	Angie A. Heath,	Ashland,	April, 1907
	Fred W. Sanborn,	New Hampton,	August, 1908
Newington.			
New Ipswich.	Frank H. Whittemore,	Smithville,	April, 1907
New London.	Dr Charles A. Lamson,	Elkins,	Dec., 1907
	A. B. Stevenson,	New London,	Dec., 1907
	Dr. N L. Griffin, Sec.,	New London,	March 10, 1908
Newmarket.	Joseph B. Bennett,	Newmarket,	1907
	Henry C. George, Sec.,	Newmarket,	1908
	Dr. J Monge,	Newmarket,	1908
Newport.	Arthur C. Bradley,	Newport,	April 21, 1906
	Dr. John L. Cain,	Newport,	April 21, 1906
	Herbert A. Willey, Sec.,	Newport,	June 15, 1907
Newton,	Jesse E. George, Sec.,	Newton Junction,	March 17, 1906
	Dr. J. F. Axtell,	Newton,	March 17, 1907
	Charles Dart,	Newton,	April 24, 1908
Northfield.	Arthur J. Roy,	Tilton,	April 30, 1907
	Harry W. Muzzey, Sec.,	Tilton,	March 31, 1906
	George S. Morrison,	Tilton,	April 30, 1907
North Hampton.	William D. Watson,	Northwood Narrows,	May 25, 1907
	Dr. George V. Fiske,	Northwood Ridge,	May 25, 1907
Nottingham.	Dr. Fred Fernald, Sec.,	Nottingham,	1906
	Frank P. Smith,	Nottingham,	1907
	Jessie M. K. Smith,	North Nottingham,	1908
Orange.	Board *elected*, therefore not legal.		
Orford.	Dr. Ezra C. Chase,	Orford,	March, 1908
	William E. Chamberlin,	Orford,	March, 1908
	George F. Niles,	Orfordville,	March, 1908
Ossipee.	Dr. L. W. Lord,	West Ossipee,	April 21, 1908
	Dr. E. W. Hodsdon,	Centerville,	April 21, 1908
Pelham.	Dr. Edward Hyde, Sec.,	Pelham,	August 22, 1906
	Daniel M. Webster,	Pelham,	Feb. 15, 1908
	Willis H Nutting,	Nashua, R. F. D. No. 3,	April 16, 1908
Pembroke.	Fred W Saltmarsh, Sec.,	Suncook,	May 5, 1906
	Charles B. Abbott,	Suncook,	March 26, 1907
	Fred M. Millard,	Suncook,	
Peterborough.	Daniel M White,	Peterborough,	June 12, 1908
	Charles A. Jaquith, Sec.,	Peterborough,	April 9, 1897
	Dr. Charles H. Cutler,	Peterborough,	May 1, 1906
Piermont.	H Eugene Morrison, Sec.,	Piermont,	April 18. 1908
	Hubbard S. Stanley,	Piermont,	April 18, 1908
	C. A. Rodimon,	Piermont,	1895
Pittsburg.	James H. Bacon,	Pittsburg,	April 14, 1905
	H. Augustus Blanchard,	Pittsburg,	April 14, 1905

Pittsfield.	Frank O. George,	Pittsfield,	April 16, 1906
	Dr. Bert W. Carr,	Pittsfield,	March 13, 1907
	Samuel F. Jenkins, Sec.,	Pittsfield,	March 16, 1908
Plainfield.	Dr. E. L. Huse,	Meriden,	April 15, 1908
	Nathan R. Andrews,	Meriden,	April 20, 1908
	Edwin G. Kenyon,	Plainfield,	March 11, 1904
Plaistow.	Dr. E. A. Landman,	Plaistow,	March 16, 1907
	John H. Noyes,	Plaistow,	March 16, 1907
	Warren C. Bayley,	Plaistow,	March 12, 1908
Plymouth.	George W. Little,	Plymouth,	April 23, 1906
	L. D. Fogg,	Plymouth,	April 20, 1907
	W. J. Randolph,	Plymouth,	March 13, 1908
Portsmouth.	Dr. Charles E. Johnston,	Portsmouth,	June 25, 1908
	William T. Lyons,	Portsmouth,	Jan. 9, 1908
	William P. Young, Sec.,	Portsmouth,	June 25, 1908
Randolph.	Thaddeus L. Lowe,	Randolph,	April 21, 1906
	Francis C. Wood,	Randolph,	May 20, 1907
	Irving R. Leighton,	Randolph,	April 20, 1908
Raymond.	J. Carl Ladd,	Raymond,	March 31, 1907
	Joseph A. Blake,	Raymond,	April 5, 1906
	Dr. G. H. Guptill, Sec.,	Raymond,	March 31, 1908
Richmond.	Asa H. Bullock, Sec.,	Winchester, R. F. D. No. 4,	May 5, 1906
	Leason Martin,	North Richmond,	August 3, 1908
	Almon Twitchell,	North Richmond,	August 3, 1908
Rindge.	Lawrence B. Hatch, Sec.,	West Rindge,	May 15, 1907
	Arthur E. Taggart,	West Rindge,	August 14, 1908
	Henry M. Woodward,	West Rindge,	August 17, 1908
Rochester.	Dr. Forrest L. Keay, Sec.,	Rochester,	Jan. 3. 1906
	Dr. Dudley L. Stokes,	Rochester,	Jan. 1, 1908
	Charles E. Goodwin,	Rochester,	March 5, 1907
Rollinsford.	Ralph S. Wentworth, Sec.,	Salmon Falls,	August 6, 1906
	Henry B. Davis,	Salmon Falls,	April 16, 1907
Roxbury.	Almon A. Davis,	Keene,	April 1, 1908
	Cyrus K. Ellis,	Keene,	April 1, 1907
	Cassius M. C. Phillips, Sec.,	East Sullivan,	April 1, 1906
Rumney.	J. R. Little, Sec.,	Rumney Depot,	April 2, 1907
	J. A. Drew,	Rumney,	April 2, 1907
	F. A. Atwood,	West Rumney,	April 11, 1908
Rye.	Dr. C. F. Patterson, Sec.,	Rye,	April 5, 1906
	Alfred C. Philbrick,	Rye,	April 1, 1907
	Charles H. Lear,	Rye,	April 5, 1906
Salem.	Francis E. Higgins,	Salem Depot,	Oct. 7, 1907
	Dr. Lewis F. Soule,	Salem Depot,	May 16, 1908
	John J. Hunt, Sec.,	Salem Depot,	August 10, 1908
Salisbury.	Buron W. Sanborn,	Andover, R. F. D., No. 1,	May 10, 1906
	John Shaw,	West Salisbury,	April 1, 1908
	Charles A. Green, Sec.,	Andover, R. F. D., No. 1,	March 30, 1908
Sanbornton.	Edwin W. Lane,	Hill,	March 20, 1908
	Dr. George C. Ward, Sec.,	Sanbornton,	March 13, 1907
	Charles H. Odell,	Laconia, R. F. D.,	March 17, 1906
Sandown.	Edwin C. Mills,	Chester, R. F. D., No. 3,	April 27, 1907
	John G. Goodwin, Sec.,	Chester, R. F. D., No. 3,	August 3, 1908
	Burton S. Lovering,	Chester, R. F. D., No. 3,	August 3, 1908
Sandwich.	Dr. A. B. Hoag, Sec.,	Center Sandwich,	April 25, 1908
	F. E. Bryar,	Whiteface,	April 25, 1908
	Henry N. Clay,	Center Sandwich,	April 25, 1908
Seabrook.			
Sharon.			
Shelburne.			

Somersworth.	Leslie C. Patten,	Somersworth,	April 1, 1908
	Dr. Napoleon Leduc,	Somersworth,	April 1, 1908
	John J. Gagnon, Sec.,	Somersworth,	April 1, 1908
South Hampton.	Israel S. Merrill,	Amesbury, Mass., R. F. D.,	April 29, 1907
	Samuel M. Prescott,	Amesbury, Mass., R. F. D.,	April 25, 1906
	George B. Palmer, Sec.,	Amesbury, Mass., R. F. D.,	Oct. 25, 1908
Springfield.	Dr. David P. Goodhue,	West Springfield,	March 31, 1906
	Charles McDaniel,	Enfield, R. F. D.,	Feb. 15, 1907
	Orin T. Hill,	Springfield,	May 11, 1908
Stark.	James W. Hickey, Sec.,	Stark,	April 24, 1906
	Charles S. Page,	Stark,	May 18, 1907
	Joseph Montgomery,	Stark,	August 26, 1908
Stewartstown.	Dr. F. W. McLaughlin,	West Stewartstown,	June 28, 1906
	E. H. Hall,	West Stewartstown,	Sept. 11, 1906
Stoddard.	James D. Cutter,	Stoddard,	May 9, 1908
	Albert H. Holland,	Stoddard,	April 26, 1907
	George F. Reed, Sec.,	Stoddard,	April 26, 1907
Strafford.	Charles S. Hanson,	Strafford,	June, 1907
	Walter H. Babb,	Rochester, R. F. D., No. 1,	Jan. 24, 1908
	Herbert E. Tasker,	Center Barnstead,	June 6, 1908
Stratford.	Dr. Frank W. Evans,	Coös,	May 5, 1908
	Alvin L. Wheeler,	Stratford,	March 17, 1907
	John C. Pattee,	Coös,	Nov. 5, 1906
Stratham.	Charles Grant, Jr.,	Stratham,	March 21, 1908
	Fred N. Edmonds, Sec.,	Stratham,	April 20, 1907
	John W. Marsh,	Stratham,	May 4, 1906
Sullivan.	Charles W. Hubbard, Sec.,	East Sullivan,	April 18, 1906
	Winfred J. White,	Sullivan,	April 16, 1907
	Frank E. Jewett,	Sullivan,	April 23, 1908
Sunapee.	Willard W. Chase,	George's Mills,	April 4, 1906
	Albert D. Felch,	Sunapee,	March 11, 1908
Surry.	Sidney J. Wilder,	Surry,	March, 1906
	Hollis W. Harvey,	Surry,	March, 1907
	Hiram F. Newell,	Surry,	March, 1908
Sutton.	Harry S. Watkins, Sec.,	Sutton,	April 29, 1908
	Francis E. Ferry,	South Sutton,	April 29, 1908
	Fred L. Howe,	North Sutton,	April 29, 1908
Swanzey.	Dr. George I. Cutler, Sec.,	West Swanzey,	March 30, 1907
	John C. Bourn,	East Swanzey,	March 30, 1907
	John Phillips,	Swanzey,	March 31, 1904
Tamworth.	George F. Batchelder,	Tamworth,	1906
	Edward Remick,	Tamworth,	1908
Temple.	W. E. Hayward, Sec.,	Temple,	March 31, 1906
	A. T. Rockwood,	Temple,	December 4, 1907
Thornton.			
Tilton.	Charles A. Towns, Sec.,	Tilton,	April, 1906
	A. T. Cass,	Tilton,	April, 1907
	Dr. C. H. Gould,	Tilton,	April, 1908
Troy.	Dr. Melvin T. Stone, Sec.,	Troy,	March, 1906
	Henry L. Barnard,	Troy,	March, 1907
	Dr. Harry S. Platts,	Troy,	March, 1908
Tuftonborough.	Joseph C. Blake,	Mirror Lake,	April 2, 1906
	John A. Stackpole,	Melvin Village,	April 2, 1906
Unity.	Hiram N. Johnson,	Quaker City,	May, 1907
	Frank Wright,	East Unity,	April 16, 1908
	Frank Reed, Sec.,	Unity,	April 16, 1908
Wakefield.	Dr. Wilbert S. Davis,	Sanbornville,	April 17, 1906
	Dr. John A. Stevens,	Union,	April 24, 1907
	Dr. Harry A. Moody,	Sanbornville,	April 16, 1908
Walpole.	Dr. Oscar L. Corliss,	Walpole,	December 3, 1904
	Dr. W. P. Craig,	Walpole,	August 1, 1907
	Patrick Lyman,	North Walpole,	May 9, 1908

Warner.	E. C. Cole, Sec.,	Warner,	April, 1906
	Dr. J. F. Merrill,	Warner,	April, 1907
	Dr. L. H. Coggswell,	Warner,	April, 1908
Warren.	Dr. F. S. Gerald,	Warren,	March 15, 1908
	Dr. G. A. Weaver,	Warren,	March 15, 1908
	Alpha Clement,	Warren,	March 15, 1908
Washington.	E. Everett Lord,	Washington,	April 27, 1908
	C. M. J. Fletcher,	East Washington,	April 27, 1908
	Albert F. Wright,	Washington,	April 27, 1908
Waterville.			
Weare.	Dr. Frank Eaton, Sec.,	East Weare,	March 17, 1906
	W. W. Eastman,	South Weare,	March 16, 1907
	J. P. Simons,	North Weare,	March, 1908
Webster.			
Wentworth.	Elias McGinnis,	West Rumney,	July 20, 1906
	Neal D. Johnson, Sec.,	Wentworth,	April 24, 1908
	Dr. Samuel Fraser,	Wentworth,	June 4, 1908
Wentworth's Loc.			
Westmoreland.	Dr. James A. Craig,	Westmoreland,	September 18, 1906
	Carroll F. Capron,	East Westmoreland,	March 20, 1901
	Fred E. Cole,	Ware's Ferry,	
Whitefield.	Dr. George H. Morrison,	Whitefield,	May 3, 1906
	Charles P. Carleton, Sec.,	Whitefield,	May 15, 1907
	Ezra C. Weeks,	Whitefield,	May 15, 1908
Wilmot.	James R. Currier,	Wilmot,	April 30, 1908
	Fred E. Goodhue,	Wilmot,	April 30, 1907
	George B. Tewksbury,	Wilmot,	April 25, 1906
Wilton.	Frank E. Proctor,	Wilton,	March, 1906
	Dr. George W. Hatch, Sec.,	Wilton,	March, 1908
	William E. Durgin,	Wilton,	June, 1908
Winchester.	Dr. W. A. Basch,	Ashuelot,	March 23, 1907
	Dr. A. J. Lobdell, Sec.,	Winchester,	March 20, 1906
	F. P. Kellom,	Winchester,	March 23, 1908
Windham.	H. C. Russell,	West Windham,	1907
	Fred S. Webster,	Canobie Lake,	1907
	C. B. Clark,	Windham Depot,	1908
Windsor.	Joseph R. Nelson, Sec.,	Hillsborough,	March, 1906
	Joseph C. Chapman,	Hillsborough,	March, 1907
	Walter A. Jacobs,	Hillsborough Upper Village,	March, 1908
Wolfeboro.	Dr. N. H. Scott,	Wolfeboro,	March 1, 1908
	Dr. F. C. Tobey,	Wolfeboro,	March 1, 1907
	C. O. Doe, Sec.,	Wolfeboro,	June 15, 1908
Woodstock.	Dr. E. L. Casey,	North Woodstock,	March 14, 1908
	E. L. Varney,	North Woodstock,	March 14, 1908
	T. F. Sawyer,	Woodstock,	March 14, 1908

FINANCIAL STATEMENT.

In accordance with chapter 98, Laws of 1907, the following financial statement is presented, covering the biennial period ending August 31, 1908:

EXPENSES OF STATE BOARD OF HEALTH,

SEPTEMBER 1, 1906, TO AUGUST 31, 1907.

Salary of Secretary	$2,500.00
Salary of Clerk	500.00
Postage and Express Charges	115.17
Telephone Service	50.35
Printing	70.39
Inspection Service	55.20
Typewriter	81.00
Incidental Expenses	87.62
Total	$3,459.73

EXPENSES OF STATE BOARD OF HEALTH,

SEPTEMBER 1, 1907, TO AUGUST 31, 1908.

Salary of Secretary	$2,500.00
Salary of Clerk	500.00
Postage and Express Charges	82.71
Telephone Service	46.60
Printing	156.31
Inspection Service	166.59
Incidental Expenses	97.81
Total	$3,553.02

STATE LABORATORY OF HYGIENE,

EXPENSES SEPTEMBER 1, 1906, TO AUGUST 31, 1907.

Salaries of Chemists (2)	$2,114.98
Salaries of Bacteriologists (2)	1,891.66
Rent of Laboratory Rooms	370.00
Services of Janitor	84.00
Printing *Sanitary Bulletin* and Blanks	246.60
Chemical Supplies	203.50
Apparatus for Special Examinations	170.77
Postage and Express	111.56
Telephone Service	90.23
Lighting and Power	79.61
Incidentals (including purchase of many samples of foods, drugs, etc.; traveling expenses, repairs, instruments, etc.)	274.15
Total	$5,637.06
Bills Chargeable to and paid by State License Commission	785.75
Total Chargeable to Appropriation	$4,851.31

STATE LABORATORY OF HYGIENE,

EXPENSES SEPTEMBER 1, 1907, TO AUGUST 31, 1908.

Salaries of Chemists (2)	$2,250.00
Salaries of Bacteriologists (2)	1,566.64
Rent of Laboratory Rooms	370.00
Services of Janitor	84.00
Printing *Sanitary Bulletin*, Blanks and Stock	474.77
Chemical Supplies	106.07
Apparatus for Special Work	122.54
Postage and Express	193.07
Telephone Service	80.66
Lighting and Power	98.03
Typewriter Exchange	50.00
Incidentals (including purchase of many samples of foods, drugs, etc., traveling expenses, repairs, instruments, etc.)	443.28
Total	$5,839.06
Bills Chargeable to and paid by State License Commission	750.00
Total Chargeable to Appropriation	$5,089.06

EPIDEMIC FUND EXPENDITURES.

On account of Smallpox and Diphtheria for the year 1907 .	$240.19
On account of Smallpox and Diphtheria for the year 1908 .	120.50

Every bill and item which goes to make up the foregoing generalized statements of expenditure of the State Board of Health and the State Laboratory of Hygiene has been submitted to and approved by the governor and council, and the vouchers are on file with the state treasurer and in the office of the State Board of Health.

STATEMENT OF THE OPERATION OF THE EMBALMERS' LAW.

From the passage of the law in 1899 there have been:

219 registrations at $1 each	$219.00
216 licenses issued at $5 each	1,080.00
Total receipts	$1,299.00
Total expenses	883.31
Balance	$415.69
Paid state treasurer	200.00
Balance on hand	$215.69

RECEIPTS AND EXPENSES BY YEARS.

	1899 and 1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.
Receipts...	$784.00	$70.00	$60.00	$75.00	$20.00	$40.00	$100.00	$75.00	$75.00
Expenses...	360.56	72.55	84.95	95.90	54.85	38.00	49.50	51.50	125.50

From the first it has been the aim of the State Board of Health to make the fees received bear all of the expenses of carrying out the provisions of the law and to accomplish which the board directed the secretary to hold all moneys received, subject to its order. A surplus above expenses of over four hundred dollars having accumulated, the board directed the secretary to turn over to the state treasurer the sum of $200. Balances will be paid to the state treasurer from time to time as the board directs. The yearly expenses consist wholly of printing the various blanks used, postage and stationery.

INDEX.

INDEX.

	PAGE.
Act to provide for a food inspector	xvi
Acworth, water supply	8
A. D. S. Headache Wafers, examination of	225
Advice to the Village Precinct of New Hampton relative to proposed Water Supply	150
Albany, water supply	8
Alexandria, water supply	8
Allenstown, water supply	8
Alstead, water supply	8
Alton, water supply	9
Amherst, rabies in	283
water supply	10
Analysis of an Abnormal Maple Syrup	231
Andover, water supply	11
Antimony, black, examination of	210
Antrim, water supply	12
Ashland, water supply	13
Asquam Lakes, protection of	137
Atkinson, water supply	13
Auburn, water supply	14
Ayer's Hair Vigor, examination of	217
Bacteriological examinations, interpretation of results	293
Baking Powder, examination of	189
Barnstead, water supply	14
Barrington, water supply	14
Barry's Trycopherous or *Medicated Compound*	219
Bartlett, water supply	15
Bath, water supply	16
Bay Rum, examination of	221
Bedford, rabies in	280
water supply	16
Beeswax, examination of	210
Belmont, water supply	17
Bennington, water supply	18
Benton, water supply	18
Berlin, water supply	18
Bethlehem, water supply	21
Beverages, examinations of	187
bottled, examinations of	188

Beverages, malt, examinations of 265
Black Antimony, examination of 210
Boards of health, town, personnel of 307
Boscawen, water supply 21
Bow, water supply 22
Bradford, Vt., rabies in 282
Bradford, water supply 22
Brentwood, water supply 23
Bridgewater, water supply 23
Bristol, water supply 23
Brookfield, water supply 23
Brookline, water supply 24
Caffodyne, examination of 225
Spiritus, examination of 212
Camphorated Oil, examination of 212
Campton, water supply 24
Carroll, water supply 25
Canaan, water supply 24
Candia, water supply 25
Canine Rabies, report of the work done from December 26, 1906, to August 31, 1908, at the State Laboratory of Hygiene, by Howard N. Kingsford, M. D., and George S. Graham, M. D. 266
Canterbury, water supply 25
Catsups, examination of 190
Celery salt, examination of 191
Center Harbor, water supply 26
Cera Alba, examination of 210
Champlin's Liquid Pearl, examination of 220
Charlestown, water supply 27
Chatham, water supply 27
Chester, water supply 27
Chesterfield, water supply 27
Chichester, water supply 27
Chokolate Compound, examination of 230
Cider vinegar, examinations of 192
Clams, decomposition of 241
Clarksville, water supply 30
Claremont, rabies in 282, 285
water supply 27, 152
Coffees, misbranded 191
Coke's Dandruff Cure, examination of 217
Colebrook, water supply 30
Columbia, water supply 31
Commission of Lunacy vii
Concerning a decomposition of clams and its effect on their edibility, by C. D. Howard 241
Concord, rabies in ..... 274 *et seq*
water supply 31

Contoocook, rabies in 276
Conway, water supply 34
Cornish, water supply 35
Corollas Hair Tonic, examination of 217
Crani-Tonic Hair Food, examination of 219
Cream of Tartar, examinations of 189
Croydon, water supply 35
Daggett & Ramsdell's Cold Cream, examination of 221
Dalton, water supply 36
Danderine, examination of 218
Danville, water supply 36
Date of the can 174
Deaths from various causes for twenty-four years, 1884–1907 x
Deerfield, water supply 36
Deering, water supply 36
Derry, rabies in 274, 277
water supply 37
Diozo, examination of 226
Diphtheria, examinations for 293
by towns 298
Dogs, symptoms of rabies in 285
how to deal with 286
Dorchester, water supply 37
Dover, water supply 37
Dr. T. Felix Gouraud's Oriental Cream or Magical Beautifier, examination of 220
Drug inspection 208
Dublin, water supply 44
Dummer water supply 44
Dunbarton, water supply 44
Durham, water supply 44, 144
Dyspepsia Biscuit, examination of 230
East Kingston, water supply 46
Easton, water supply 46
Eaton, water supply 46
Effingham, water supply 46
Elkins, water supply 46
Ellsworth, water supply 46
Embalmers, examination of xvii
law, statement of operation of 320
Enfield, water supply 46
Epping, rabies in 284
water supply 49
Epsom, water supply 49
Errol, water supply 49
Examination of Alcoholic Liquors, by C. D. Howard 246
Examination of Water Supplies, by C. D. Howard 3
Examination of hair tonics and other preparations 216

Extract of Witch Hazel, examination of 221
Exeter, water supply 50
Extracts, flavoring, examinations of 195
lemon 197
orange 199
peppermint 200
vanilla 199
wintergreen 200
methods of analysis employed in the examination of 232
precipitation methods for the estimation of oils in 237
Farmington, water supply 51
Ferri Chloride, Tinct., examination of 214
Fever, typhoid, examinations for 293
by towns 301
Filters, mechanical 132
Financial statement 318
Fire escapes, in relation to xix
Fitzwilliam, water supply 51
Flavors, imitation fruit, not properly labeled 200
Florida Water, examination of 221
Flour, Cresco, examination of 228
Flours, gluten, examination of 200
Food, Drug and Liquor Inspection, by C. D. Howard 171
Food examinations 180
inspector, act to provide for xvi
Foods posing as "Cures" 227
Foso Bark, examination of 218
Francestown, water supply 51
Franconia, water supply 52
Franklin, water supply 52
Freedom, water supply 57
Fremont, water supply 57
Frumenti, Spiritus, examination of 213
Gilford, water supply 57
Gilmanton, water supply 57
Gilsum, water supply 57
Gluten flours, examination of 200
Goffstown, rabies in 279
water supply 57
Gonococci, examinations for 301
Gorham, water supply 58
Goshen, water supply 59
Grafton, water supply 59
Graham, Dr. George S., report on canine rabies 266
Grantham, water supply 59
Grape-Nuts and Postum Cereal, examination of 227
Greenfield, water supply 59

[illegible] water supply 4
[illegible] water supply 4
[illegible] water supply 4
[illegible] examination of 36
[illegible] [illegible] [illegible] [illegible] 37
Hampstead, water supply 4
Hampton, water supply 4
Hampton [illegible] improvements 24
sewer question 24
Hampton Falls, water supply 4
Hancock, water supply 40
Hanover, water supply 40
Harrisville, water supply 40
Haverhill, water supply 40
Hay's Hair Health, examination of 215
Henniker, rabies in 212, 217
water supply 40
Hill, water supply 40
Hillsborough, rabies in 217
water supply 40
Hillsborough Bridge, water supply 40
Hinds' Honey and Almond Cream, examination of 221
Hinsdale, rabies in 212, 218
water supply 40
Holderness, water supply 40
Hollis, water supply 40
Holmes' Fragrant Prunella, examination of 220
Honey, examination of 201
Hopkinton, water supply 40
Horseradish, examination of 201
Howard, C. D., Concerning a Decomposition of Clams and its Effects on Their Edibility 241
Examination of Alcoholic Liquors 246
Examination of Water Supplies 8
Food, Drug and Liquor Inspection 171
Hudson, water supply 41
Hydrophobia (see Rabies).
Ice cream, examination of 264
methods of analysis 262
Inspection of Suncook's Water Supply 42
Iodi, Tinctura, examination of 214
Jackson, water supply 41
Jaffrey, water supply 42
Jefferson, water supply 42
Keene, rabies in 212
water supply 42
Kensington, water supply 74

Kingsford, Dr. H. N., report on canine rabies 266
Kingston, water supply 74
Labeling of bulk goods 174
Laconia, water supply 75
Lancaster, water supply 76
Landaff, water supply 77
Langdon, water supply 77
Larkin's Derma Balm, examination of 221
Lebanon, water supply 77
water works 131
Lee, water supply 79
Legislative investigation of the work of the board xv
Legislation, proposed 178
Lempster, water supply 79
Lime Water, examination of 212
Lincoln, water supply 80
Linimentum Camphoræ, examination of 212
Liquor Calcis, examination of 212
Liquors, alcoholic, examination of 246
distilled, analyses of 252
malt, standards for 250
spirituous, standards for 248
Lisbon, typhoid fever in 166
water supply 81
Litchfield, water supply 81
Littleton, water supply 82
Livermore, water supply 82
Londonderry, water supply 83
Loon Lake, protection of 140
Loudon, water supply 83
Lunacy, commission of vii
Lyme, water supply 83
Lyndeborough, water supply 84
Madam Zaza Toilet Cream, examination of 220
Madbury, water supply 84
Madison, water supply 84
Malaria, examinations for 303
Manchester, rabies in 275
water supply 84
Maple products, examination of 201
syrup, abnormal, analysis of 231
Mapleine, examination of 227
Marlborough, water supply 87
Marlow, water supply 88
Mason, water supply 88
Matis, examination of 224
Menthæ Piperitæ Spirits, and *Spirits Gaultheriæ*, examination of 211
Meredith, water supply 88
Merrimack, water supply 88

Methods of analysis employed in the examination of ice cream and of certain flavoring extracts 232
Middleton, water supply 88
Milan, water supply 88
Milford, rabies in 280
water supply 89
Milk and cream examinations 181
Milton, water supply 90
Mme. Yale's Excelsior Hair Tonic, examination of 218
Molasses, examination of 205
sulphurous acid and metallic impurities in 205
Monroe, water supply 90
Mont Vernon, water supply 90
Moultonborough, water supply 90
Mrs. McCorrison's Famous Diamond Lotion, examination of 219
Munyon's Extract of Witch Hazel, examination of 222
Nashua, water supply 90
Nature Tissue Tablets, examination of 225
Nelson, water supply 92
New Boston, water supply 92
Newbro's Herpicide, examination of 218
Newbury, water supply 93
Newcastle, water supply 93
New Durham, water supply 93
Newfields, water supply 93
New Hampton, water supply 93
advice relative to 150
Newington, water supply 94
New Ipswich, water supply 94
New London, water supply 95
Newmarket, water supply 95
Newport, water supply 96
Newton, water supply 97
Northfield, water supply 97
North Hampton, water supply 99
Northumberland, water supply 98
Northwood, water supply 99
Nottingham, water supply 99
Nut products, examination of 231
Obesity Tablets, examination of 225
Orange, water supply 100
Orford, water supply 100
Ossipee, water supply 100
Parker's Hair Balsam, examination of 217
Paugus, Lake, protection of 135
Pelham, rabies in 273
Pembroke, water supply 100
Penacook, rabies in 283
water supply 102

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INDEX.

INDEX.

	Page.
Act to provide for a food inspector	xvi
Acworth, water supply	8
A. D. S. Headache Wafers, examination of	225
Advice to the Village Precinct of New Hampton relative to proposed Water Supply	150
Albany, water supply	8
Alexandria, water supply	8
Allenstown, water supply	8
Alstead, water supply	8
Alton, water supply	9
Amherst, rabies in	283
water supply	10
Analysis of an Abnormal Maple Syrup	231
Andover, water supply	11
Antimony, black, examination of	210
Antrim, water supply	12
Ashland, water supply	13
Asquam Lakes, protection of	137
Atkinson, water supply	13
Auburn, water supply	14
Ayer's Hair Vigor, examination of	217
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Bartlett, water supply	15
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Bedford, rabies in	280
water supply	16
Beeswax, examination of	210
Belmont, water supply	17
Bennington, water supply	18
Benton, water supply	18
Berlin, water supply	18
Bethlehem, water supply	21
Beverages, examinations of	187
bottled, examinations of	188

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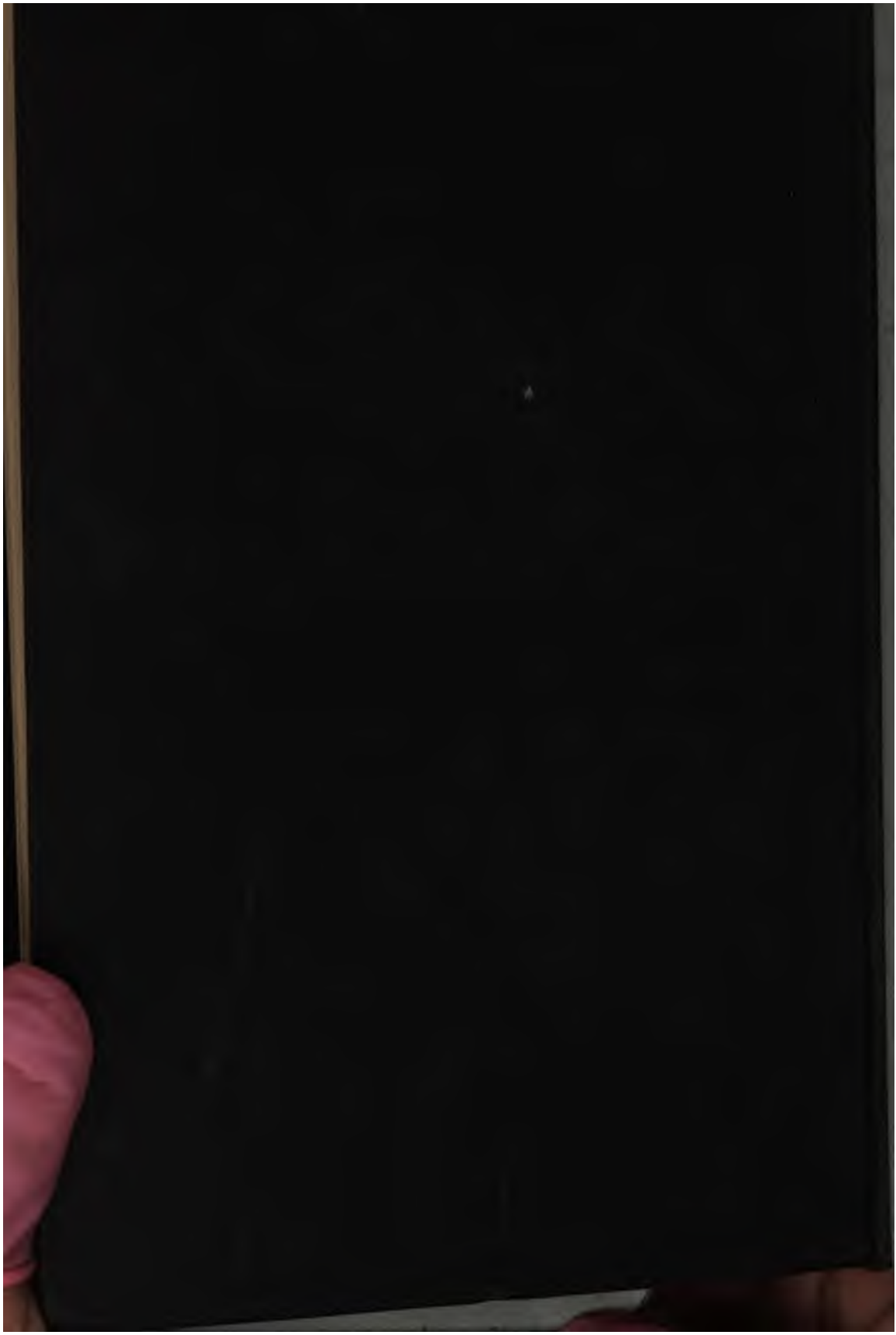
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